

JVC

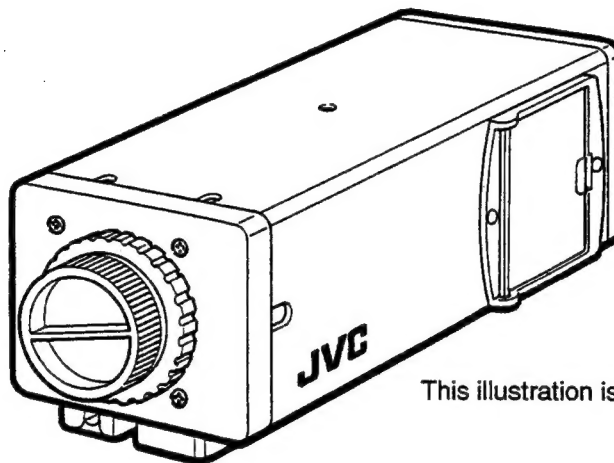
SERVICE MANUAL

COLOR VIDEO CAMERA HEAD

TK-1280E/TK-1180E/TK-1281EG

BASIC CHASSIS

YU



This illustration is Model TK-1280.

NOTE:

This service manual is for TK-1280E assembled in Hachioji factory.

For the unit assembled in Iwai factory, see service manual number 50716.

The serial numbers

from 09852451 and after

Hachioji

from 10710001 to 09852450

Iwai

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INSTRUCTIONS

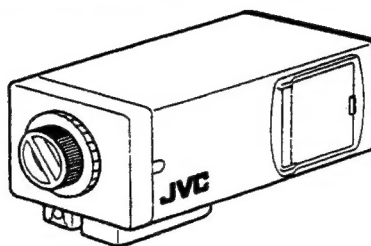
JVC

TK-1180E

COLOUR VIDEO CAMERA HEAD

BEDIENUNGSANLEITUNG: FARB-VIDEOKAMERAKOPF

MANUEL D'INSTRUCTIONS: TÊTE DE CAMERA VIDEO COULEUR



TK-1280E instructions see the
TK-1280E service manual No. 50716.

INSTRUCTIONS

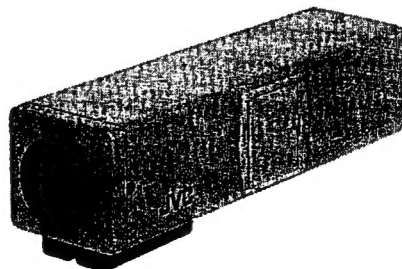
JVC

TK-1281EG

COLOUR VIDEO CAMERA

BEDIENUNGSANLEITUNG: FARB-VIDEOKAMERA

MANUEL D'INSTRUCTIONS: CAMERA VIDEO COULEUR



WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION:

To prevent electric shock, do not open the unit. No user serviceable parts inside. Refer servicing to qualified service personnel.

CAUTION:

To prevent electric shocks and risk of fire hazards, do NOT use other than the specified power source.

This installation should be made by a qualified service person and should conform to all local codes.

Thank you for purchasing a JVC colour video camera head. To obtain the best results from your new camera, read this instruction manual carefully before use; retain the manual for future reference.

This instruction manual is divided into three sections: English, German, French.

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WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

**WARNING—THIS APPLIANCE MUST
BE EARTHED
IMPORTANT**

The wires in this mains lead are coloured in accordance with the following code:

| | |
|-------------------|---------|
| GREEN-AND-YELLOW: | EARTH |
| BLUE: | NEUTRAL |
| BROWN: | LIVE |

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol \perp or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

Thank you for purchasing a JVC colour video camera.

To obtain the best results from your new camera, read this instruction manual carefully before use; retain the manual for future reference.

This instruction manual is divided into three sections: English, German, French.

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FEATURES

- CCD IRIS function to automatically set the brightness of the picture by changing the shutter speed of the camera according to the light incident when using a manual iris lens.
- AGC (Automatic Gain Control) function to automatically increase camera's sensitivity when the level of ambient light drops.
- Built-in back-light compensation function
- Either the galvanometric auto-iris lens or the video-level-sensing auto-iris lens can be used.
- TTL (Through-The-Lens) auto tracking white balance adjustment with preset luminous intensity (☉) and manual override (2 axes; G-Mg and R-B)
- Changeable C/CS lens mount allows selection from a wide range of lenses.
- Gen-lock and line-lock functions are provided.
- Built-in electronic shutter to allow switching to 9 shutter speeds.
- Convenient external flange-back adjustment function allows adjustment using a screwdriver.
- Compact, light-weight design greatly reduces the space required for installation.
- AC or DC operation.

PRECAUTIONS (USE)

When operation is incorrect or a malfunction is observed:

While operation, if any abnormal condition (strange sound, smell or smoke) or a malfunction (no picture, etc.) is observed, stop using the camera immediately, turn the power off, then call your local dealer.

Cleaning

Turn the power off and wipe off the dirt with a dry soft cloth. If it is extremely dirty, use furniture cleaner to wipe it off.

To clean the lens, use a blower of lens cleaning tissue (available from any camera dealer).

- **Do not point the camera at the sun.** This could damage the camera whether it is operating or not.
- **Do not shoot any source of bright light.** If the object contains very bright areas, bright vertical or horizontal lines may appear on the screen. This is called "smear", a phenomenon which often occurs with solid-state pickups, and is not a malfunction.
- **Do not disassemble the camera** and never touch parts inside the camera as you could damage the camera.
- **Do not allow anything to get inside the camera.** If a metal or flammable object gets inside the camera, it may cause a malfunction.
- **Handle with care.** Do not drop the camera or subject it to shocks and vibrations to avoid possible damage.

*Also read "Precautions (installation)" on page 21 carefully.

3

FEATURES

- Automatic Electronic Shutter function to automatically set the brightness of the picture by changing the shutter speed of the camera according to the light incident when using a manual iris lens.
- AGC (Automatic Gain Control) function to automatically increase camera's sensitivity when the level of ambient light drops.
- Built-in back-light compensation function
- Either the galvanometric auto-iris lens or the video-level-sensing auto-iris lens can be used.
- TTL (Through-The-Lens) auto tracking white balance adjustment with preset luminous intensity (☉) and manual override (2 axes; G-Mg and R-B)
- Changeable C/CS lens mount allows selection from a wide range of lenses.
- Gen-lock and line-lock functions are provided.
- Built-in electronic shutter to allow switching to 9 shutter speeds.
- Convenient external flange-back adjustment function allows adjustment using a screwdriver.
- Separated Y/C video signal output connector.
- 220 – 240 V AC operation.

PRECAUTIONS (USE)

When operation is incorrect or a malfunction is observed:

While operation, if any abnormal condition (strange sound, smell or smoke) or a malfunction (no picture, etc.) is observed, stop using the camera immediately, turn the power off, then call your local dealer.

Cleaning

Turn the power off and wipe off the dirt with a dry soft cloth. If it is extremely dirty, use furniture cleaner to wipe it off.

To clean the lens, use a blower of lens cleaning tissue (available from any camera dealer).

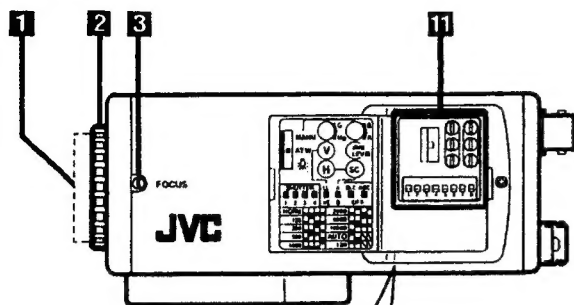
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- **Do not disassemble the camera** and never touch parts inside the camera as you could damage the camera.
- **Do not allow anything to get inside the camera.** If a metal or flammable object gets inside the camera, it may cause a malfunction.
- **Handle with care.** Do not drop the camera or subject it to shocks and vibrations to avoid possible damage.

*Also read "PRECAUTIONS (INSTALLATION)" on page 20 carefully.

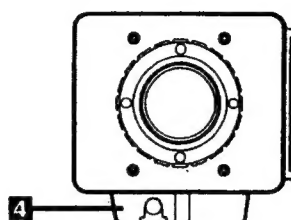
3

CONTROLS AND THEIR LOCATIONS

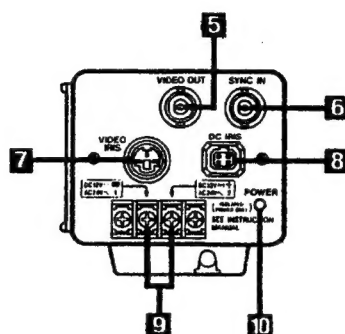
Side view



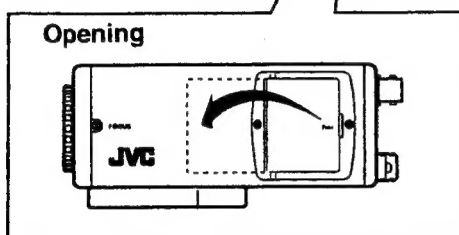
Front view



Rear view

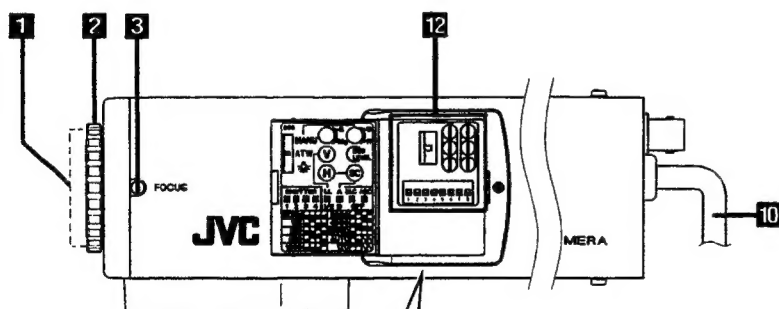


Opening

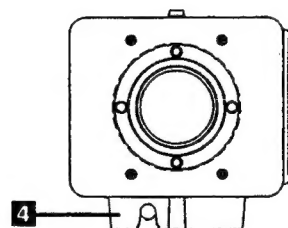


CONTROLS AND THEIR LOCATIONS

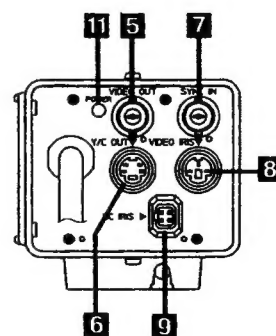
Side view



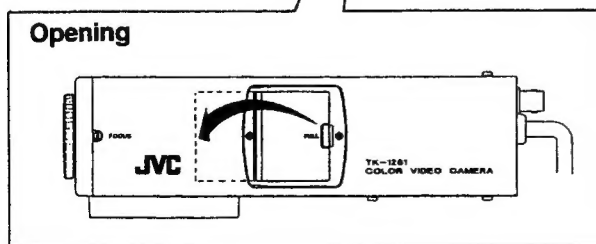
Front view



Rear view



Opening



1 Lens mount cap

Be sure to cap the lens mount when the lens is not mounted. Turn counterclockwise to remove.

2 C-mount adapter

To mount a C-mount lens a C-mount adapter is provided. To mount a CS-mount lens, remove the C-mount adapter. Any lens for 1/3", 1/2", 2/3" or 1" video camera can be used. Turn clockwise to remove it. Also refer to page 15.

3 FOCUS screw

A screw is provided to adjust and fix the flange-back (the distance from the lens mounting to the focal point). See page 16.

4 Tripod mounting base

This is the mounting base for installing the camera. See page 14 and 20.

5 VIDEO OUT connector

BNC connector that outputs a composite video signal. Connect to the video input connector of a monitor, switcher, etc.

- Use a coaxial cable for connection.

5

1 Lens mount cap

Be sure to cap the lens mount when the lens is not mounted. Turn counterclockwise to remove.

2 C-mount adapter

A C-mount adapter is provided to mount a C-mount lens. When mount a CS-mount lens, remove the C-mount adapter at first. Any lens for 1/2", 2/3" or 1" video camera can be used. Then, turn clockwise it. Also refer to page 14.

3 FOCUS screw

A screw is provided to adjust and fix the flange-back (the distance from the lens mounting to the focal point). See page 15.

4 Tripod mounting base

This is the mounting base for installing the camera. See page 13 and 19.

5 VIDEO OUT connector

BNC connector that outputs a composite video signal. Connect to the video input connector of a monitor, switcher, etc.

- Use a coaxial cable for connection.

6 Y/C OUT connector

Output connector for separated Y/C video signals. Connect to the S-VIDEO input connector of a video monitor, etc. If the plug on the cable is of a different type, replace it with the provided 4-pin plug.

Pin assignment: Y/C OUT connector (4-pin)

| Pin No. | Signal |
|---------|--|
| 1 | GND |
| 2 | GND |
| 3 | Y (Luminance, 1 Vp-p, 75 ohms) |
| 4 | C (Chrominance, 0.3 Vp-p (burst), 75 ohms) |

5

6 SYNC IN connector

- BNC connector for external sync reference signal input such as composite video signal (VBS) or black burst signal (BB).
- Connect to the connector outputting the signal to be used as a reference for external sync.
- Use a coaxial cable for connection.
- When the sync reference signal is input, the camera automatically switches from the internal to external sync mode to perform gen-lock operation.

Caution:

- Before performing gen-lock operation with the external sync signal input, make sure to set the sync mode switch to "I/E" position. (See page 12.)
- When an external H/V sync signal is input, the camera automatically switches to H/V lock mode when the sync mode switch is set in LL position. (See page 12.)

Notes:

- If the external sync signal to be input is less than -4dB with respect to the reference level, sync operation is not possible.

| | | |
|-----------------|------------------------------|-----------|
| Reference level | Composite video signal (VBS) | 1.0 Vp-p* |
| | Black burst signal (BB) | 0.45 Vp-p |

* The video components of the signal do not matter.

- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- When gen-lock operation is performed, adjustment of horizontal phase and colour sub-carrier phase are required. (See page 13.)

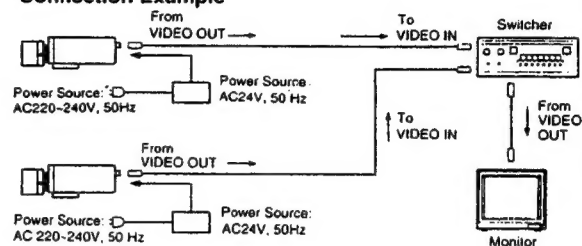
Connections for line-lock operation

- Set the sync mode switch to LL position. (See page 12.)
- When performing line-lock operation, the V phase adjustment is required. (See page 13.)

Caution:

- Do not input the external sync signal to the SYNC IN connector.

Connection Example



7 SYNC IN connector

- BNC connector for external sync reference signal input such as composite video signal (VBS) or black burst signal (BB).
- Connect to the connector outputting the signal to be used as a reference for external sync.
- Use a coaxial cable for connection.
- When the sync reference signal is input, the camera automatically switches from the internal to external sync mode to perform gen-lock operation.

Caution:

- Before performing gen-lock operation with the external sync signal input, make sure to set the sync mode switch to "I/E" position. (See page 11.)
- When an external H/V sync signal is input, the camera automatically switches to H/V lock mode when the sync mode switch is set in LL position. (See page 11.)

Notes:

- If the external sync signal to be input is less than -4dB with respect to the reference level, sync operation is not possible.

| | | |
|-----------------|------------------------------|-----------|
| Reference level | Composite video signal (VBS) | 1.0 Vp-p* |
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- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- When gen-lock operation is performed, adjustment of horizontal phase and colour sub-carrier phase are required. (See page 12.)

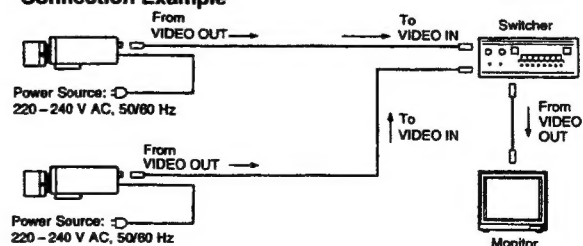
Connections for line-lock operation

- Set the sync mode switch to LL position. (See page 11.)
- When performing line-lock operation, the V phase adjustment is required. (See page 12.)

Caution:

- Do not input the external sync signal to the SYNC IN connector.

Connection Example



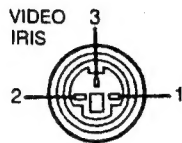
7 VIDEO IRIS connector

Connect the iris cable of an video-level-sensing auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 3-pin iris plug.

Note:

- Use video-level-sensing auto-iris lens using DC 9V - 10V with power consumption of 50 mA or less.

Pin assignment: VIDEO IRIS connector (3-pin)

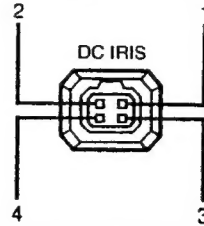


| Pin No. | Signal |
|---------|--|
| 1 | GND |
| 2 | Video (0.7 Vp-p high impedance, no sync) |
| 3 | DC 9V-10V (50 mA max.) |

8 DC IRIS connector

Connect the iris cable of the galvanometric auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 4-pin iris plug.

Pin assignment: DC IRIS connector (4-pin)



| Pin No. | Signal |
|---------|-------------|
| 1 | Control (-) |
| 2 | Control (+) |
| 3 | Drive (+) |
| 4 | Drive (-) |

7

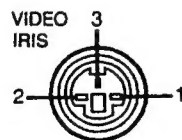
8 VIDEO IRIS connector

Connect the iris cable of an video-level-sensing auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 3-pin iris plug.

Note:

- Use video-level-sensing auto-iris lens using DC 9 V - 10 V with power consumption of 50 mA or less.

Pin assignment: VIDEO IRIS connector (3-pin)

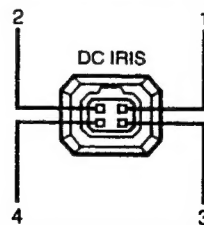


| Pin No. | Signal |
|---------|--|
| 1 | GND |
| 2 | Video (0.7 Vp-p high impedance, no sync) |
| 3 | DC 9V-10V (50 mA max.) |

9 DC IRIS connector

Connect the iris cable of the galvanometric auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 4-pin plug.

Pin assignment: DC IRIS connector (4-pin)



| Pin No. | Signal |
|---------|-------------|
| 1 | Control (-) |
| 2 | Control (+) |
| 3 | Drive (+) |
| 4 | Drive (-) |

10 Power cord

Supply power from an AC outlet (220 to 240 V).

Caution:

- Be sure not to connect the power source until all other connections are complete. Do not turn the power of any equipment on until connections are completed.

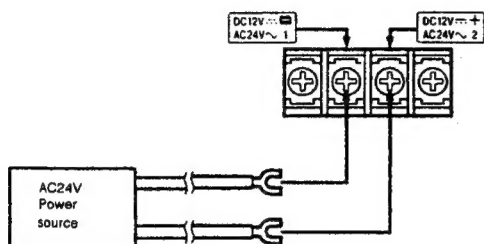
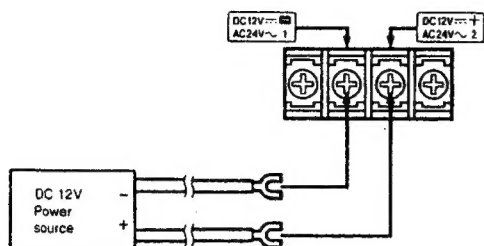
11 POWER indicator

Lights when the camera is powered.

7

9 Power input terminal (12V \equiv /24 V \sim)

Connect to a DC 12 V or AC 24 V power source. When DC 12 V power is to be supplied from an AC 220 V to 240 V power source, use the optional AC adapter AC-C624 (for the U.K.) or AC-C622 (for countries other than the U.K.). When operating with an AC 24 V power supply, use only an isolated power source.



Caution:

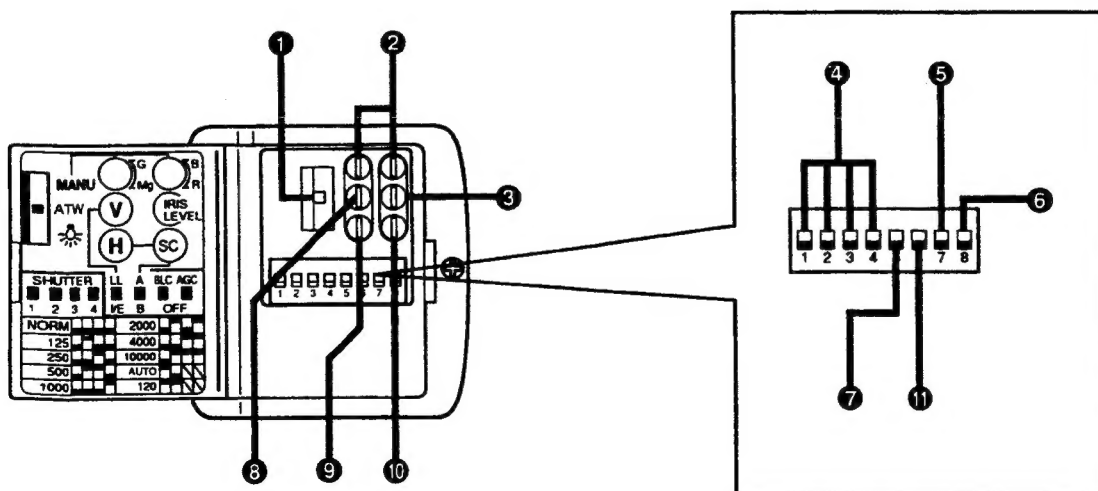
- Be sure not to connect the power source until all other connections are complete. Do not turn the power of any equipment on until connections are completed.
- The power voltage is specified as DC 12 V or AC 24 V.
- Be careful to connect the DC 12 V power supply, with the correct +/− polarity.
- Use a DC 12V power source with ripple voltage of less than 50 mV.
- Do not power the unit with both AC 24 V and DC 12 V at the same time. Be sure to connect only one power source.

10 POWER indicator

Lights when the camera is powered.

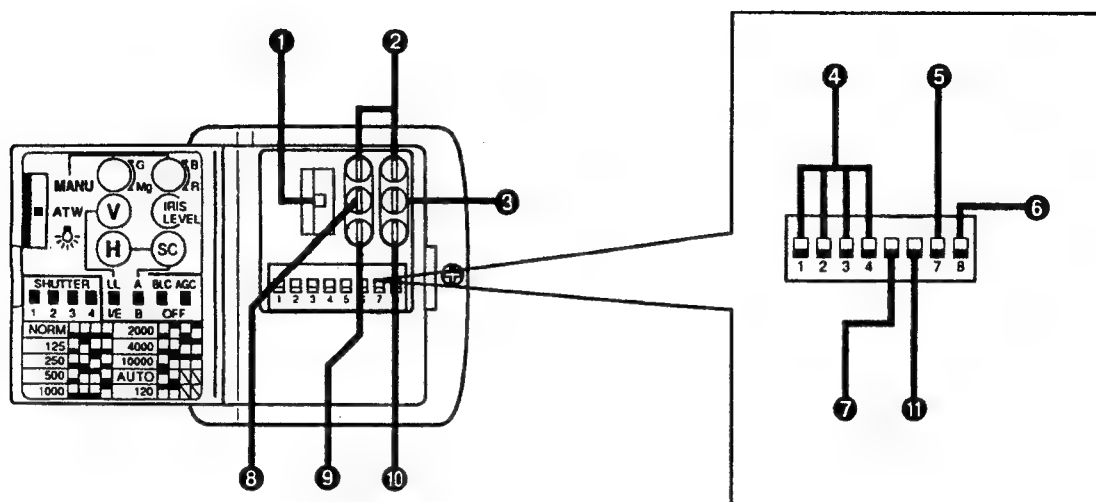
12 Picture adjustment section

AGC, BLC, Shutter mode, IRIS LEVEL, Sync mode, H/V phase, SC phase and White balance controls are provided. Perform the following adjustments and settings according to the shooting (or lighting) conditions.



11 Picture adjustment section

AGC, BLC, shutter speed, IRIS LEVEL, sync mode, H/V phase, SC phase and white balance controls are provided. Perform the following adjustments and settings according to the shooting (or lighting) conditions.



9

1 White balance adjustment switch

This is used for changing the setting of the white balance.

MANU: Manual adjustment is possible.

ATW: Accepts different types of lighting (colour temperatures ranging from approx. 2850 K to 7000 K) using an automatic tracing system. (TK-1281EG uses a TTL system that measures light entering the camera lens.)

: For shooting under the artificial light such as halogen lamps (colour temperature approx. 3200 K).

Notes:

- When using the camera under a fluorescence light with high shutter speed, the white balance may change periodically.
- The automatic tracing system may not function properly when shooting with non-standard lighting or lighting with a colour temperature that exceeds the range of the camera. Because it uses a TTL system, if a coloured object is shot (especially one with a single colour) that fills most of the camera's field of view, the colour temperature may be judged incorrectly and the correct white balance adjustment may not be possible. In such a case, set to the "MANU" position.

2 White balance adjustment controls

When the white balance adjustment switch is set to "MANU", the white balance can be adjusted manually.

G-Mg: Turn to the "G" side to increase the amount of green in the picture. Turn to the "Mg" side to increase the amount of magenta.

B-R: Turn to the "B" side to increase the amount of blue. Turn to the "R" side to increase the amount of red.

3 IRIS LEVEL control

The brightness control of the monitor picture does not operate correctly, adjust using this control. Turn OFF the AGC switch (set to ON at the factory) to adjust the IRIS LEVEL control.

| Monitor picture | Adjustment direction |
|---------------------|------------------------|
| To make it brighter | Turn clockwise. |
| To make it darker | Turn counterclockwise. |

Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric auto-iris lens or the video-level-sensing auto-iris lens.
- Be careful not to turn the IRIS LEVEL control beyond its limits as this could cause a malfunction in the camera's auto-iris control.

9

① White balance adjustment switch

This is used for changing the setting of the white balance.

MANU: Manual adjustment is possible.

ATW: Accepts different types of lighting (colour temperatures ranging from approx. 2850 K to 7000 K) using an automatic tracing system.

(TK-1180E uses a TTL system that measures light entering the camera lens.)

☼ : For shooting under the artificial light such as halogen lamps (colour temperature approx. 3200 K).

Notes:

- When using the camera under a fluorescence light with high shutter speed, the white balance may change periodically.
- The automatic tracking system may not function properly when shooting with non-standard lighting or lighting with a colour temperature that exceeds the range of the camera. Because it uses a TTL system, if a coloured object is shot (especially one with a single colour) that fills most of the camera's field of view, the colour temperature may be judged incorrectly and the correct white balance adjustment may not be possible. In such a case, set to the "MANU" position.

② White balance adjustment controls

When the white balance adjustment switch is set to "MANU", the white balance can be adjusted manually.

G-Mg: Turn to the "G" side to increase the amount of green in the picture. Turn to the "Mg" side to increase the amount of magenta.

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③ IRIS LEVEL control

The brightness control of the monitor picture does not operate correctly, adjust using this control. Turn OFF the AGC switch (set to ON at the factory) to adjust the IRIS LEVEL control.

| Monitor picture | Adjustment direction |
|---------------------|------------------------|
| To make it brighter | Turn clockwise. |
| To make it darker | Turn counterclockwise. |









































Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric-iris lens or the video-iris lens.
- Be careful not to turn the IRIS LEVEL control beyond its limits as this could cause a malfunction in the camera's auto-iris control.

④ SHUTTER mode select switch

This varies the shutter speed (the time the change is stored). Normally, when a fast-moving object is being shot, still or slow-motion played back pictures will be blurred. In this case, switching the shutter speed from the normal speed of 1/50 second to a faster speed allows each frame to be recorded with greater detail, at the higher speed.

When using a manual iris lens, the brightness of the picture image will be fixed by setting this switch in AUTO (Automatic electronic shutter) position, as the shutter speed is automatically varied according to the light incident.

| Switch position | Shutter speed |
|--|--|
| NORM     | 1/50 second Normally, set to this position. |
| 120     (Switches No. 3 and 4 can be set either in upper or lower position) | 1/120 second |
| 125     | 1/125 second |
| 250     | 1/250 second |
| 500     | 1/500 second |
| 1000     | 1/1000 second |
| 2000     | 1/2000 second |
| 4000     | 1/4000 second |
| 10000     | 1/10000 second |
| AUTO     (Switches No. 3 and 4 can be set either in upper or lower position.) | Automatic electronic shutter function (Do not set this switch in this position when using an auto-iris lens.) |

Caution:









































- The automatic electronic shutter function is not activated for a light object to be shot, such as in outdoor condition. In such a case, use the camera with the auto-iris or manual-iris.

Notes:

- Faster shutter speeds require more light than the normal speed. (In the 1000 mode, the sensitivity is approx. 1/20 that at normal speed; in the 10000 mode, approx. 1/200.)
- When shooting with the faster shutter speed, or when a light object is being shot by setting in AUTO position (the shutter speed becomes faster), the brightness and white balance may change periodically. Shooting with artificial lighting (especially fluorescent lights) will cause the pictures to flicker. Smear (bright horizontal or vertical lines) which can often be seen with solid-state pickups may appear in the picture.

④ SHUTTER mode select switch

This varies the shutter speed (the time the change is stored). Normally, when a fast-moving object is being shot, still or slow-motion played back pictures will be blurred. In this case, switching the shutter speed from the normal speed of 1/50 second to a faster speed allows each frame to be recorded with greater detail, at the higher speed. When using a manual iris lens, the brightness of the picture image will be fixed by setting this switch in AUTO (CCD iris) position, as the shutter speed is automatically varied according to the light incident.

| Switch position | Shutter speed |
|--|--|
| NORM     | 1/50 second Normally, set to this position. |
| 120     (Switches No. 3 and 4 can be set either in upper or lower position) | 1/120 second |
| 125     | 1/125 second |
| 250     | 1/250 second |
| 500     | 1/500 second |
| 1000     | 1/1000 second |
| 2000     | 1/2000 second |
| 4000     | 1/4000 second |
| 10000     | 1/10000 second |
| AUTO     (Switches No. 3 and 4 can be set either in upper or lower position.) | CCD iris function (Do not set this switch in this position when using an auto-iris lens.) |

Caution:

- The CCD iris function is not activated for a light object to be shot, such as in outdoor condition. In such a case, use the camera with the auto-iris or manual-iris.

Notes:

- Faster shutter speeds require more light than the normal speed. (In the 1000 mode, the sensitivity is approx. 1/20 that at normal speed; in the 10000 mode, approx. 1/200.)
- When shooting with the faster shutter speed, or when a light object is being shot by setting in AUTO position (the shutter speed becomes faster), the brightness and white balance may change periodically. Shooting with artificial lighting (especially fluorescent lights) will cause the pictures to flicker. Smear (bright horizontal or vertical lines) which can often be seen with solid-state pickups may appear in the picture.

11

⑤ BLC (Back Light Compensation) switch

This function makes the iris focus on an object to be shot and is located near the center position of the screen.



Brightness area

Set this switch to "ON" at the time of back-light.

ON (upper side): Back-light compensation is activated.

The iris will be opened when the circumference is lighter than the center of the screen.

The iris will be closed when the circumference is darker than the center of the screen.

OFF (lower side): Back-light compensation is not activated.

Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric auto-iris lens or the video-level-sensing auto-iris lens.
- This function is not effective when the difference of the brightness of the center of the screen and its circumference is small.

⑥ AGC (Automatic Gain Control) switch

This automatically increases the camera's sensitivity when the level of ambient light drops.

ON (upper side): AGC is activated.

OFF (lower side): AGC is not activated.

⑦ Sync mode switch

The internal/external sync mode (automatic) or line-lock sync mode (or H/V lock mode) is available with the TK-1281EG. Set the sync mode switch correctly.

LL position:

In the line-lock setting, the camera's vertical synchronization can be driven by the 50 Hz AC signal in the power lines. To select power lines phase-locked sync, set the switch to the LL position.

Furthermore, when an external H/V sync signal is input, the camera automatically switches to the H/V lock mode.

Notes:

- Do not supply an external sync reference signal when using the camera in line-lock mode.
- In the line-lock sync mode, synchronization may not be correct for a few seconds after the power is turned on; this is not a malfunction.

I/E (Internal/external) position:

Select internal/external sync by setting the sync mode switch to the I/E position. With this setting, when the external sync reference signal is input, the camera switches to the external sync mode, and when no signal is input, the camera switches to the internal sync mode automatically.

11

5 BLC (Back Light Compensation) switch

This function makes the iris focus on an object to be shot and is located near the center position of the screen.



Brightness area

Set this switch to "ON" at the time of back-light.

ON (upper side): Back-light compensation is activated.

The iris will be opened when the circumference is lighter than the center of the screen.

The iris will be closed when the circumference is darker than the center of the screen.

OFF (lower side): Back-light compensation is not activated.

Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric auto-iris lens or the video-level-sensing auto-iris lens.
- This function is not effective when the difference of the brightness of the center of the screen and its circumference is small.

6 AGC (Automatic Gain Control) switch

This automatically increases the camera's sensitivity when the level of ambient light drops.

ON (upper side): AGC is activated.

OFF (lower side): AGC is not activated.

12

7 Sync mode switch

The internal/external sync mode (automatic) or line-lock sync mode (or H/V lock mode) is available with the TK-1180E. Set the sync mode switch correctly.

LL position:

In the line-lock setting, the camera's vertical synchronization can be driven by the 50 Hz AC signal in the power lines. To select power lines phase-locked sync, set the switch to the LL position.

Furthermore, when an external H/V sync signal is input, the camera automatically switches to the H/V lock mode.

Notes:

- Do not supply an external sync reference signal when using the camera in line-lock mode.
- In the line-lock sync mode, synchronization may not be correct for a few seconds after the power is turned on; this is not a malfunction.
- Line-lock sync operation is possible only when used with an AC power source (AC 24V, 50 Hz)

I/E (internal/external) position:

Select internal/external sync by setting the sync mode switch to the I/E position. With this setting, when the external sync reference signal is input, the camera switches to the external sync mode, and when no signal is input, the camera switches to the internal sync mode automatically.

8 V phase adjustment

If the camera is to be used in the line-lock sync mode, the vertical phase may require adjustment to synchronize the vertical phase of the camera with other camera in the system. (Vertical phase is adjustable over the range of $\pm 90^\circ$.) Make this adjustment when the vertical phase of the camera does not match with other cameras (or systems). For correct adjustment, use a multichannel oscilloscope. This vertical phase adjustment can only be made when the camera is operating in the line-lock sync mode

Notes:

- When AC power line frequency is of 60 Hz, the line-lock sync operation is not possible.
- This adjustment is necessary only when the line-lock sync operation is performed.

9 H phase adjustment

For adjusting the horizontal phase when gen-lock (or H/V lock) operation is performed. Adjust with reference to other camera(s) in the system.

Notes:

- Gen-lock (or H/V lock) operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock (or H/V lock) operations are performed.

12

10 SC phase fine adjustment control

11 SC phase coarse adjustment switch

For adjusting the colour sub-carrier phase when gen-lock operation is performed. Adjust by changing the setting of the SC phase coarse adjustment switch (A/B) in conjunction with the SC phase fine adjustment control with reference to other camera(s) in the system.

Notes:

- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock operations are performed.

8 V phase adjustment

If the camera is to be used in the line-lock sync mode, the vertical phase may require adjustment to synchronize the vertical phase of the camera with other camera in the system. (Vertical phase is adjustable over the range of $\pm 90^\circ$.) Make this adjustment when the vertical phase of the camera does not match with other cameras (or systems). For correct adjustment, use a multichannel oscilloscope. This vertical phase adjustment can only be made when the camera is operating in the line-lock sync mode

Notes:

- When AC power line frequency is of 60 Hz, the line-lock sync operation is not possible.
- When adjusting the V phase control to observe the AC 24 V waveform, connect the positive pin of a probe to either of the power input connector.
- This adjustment is necessary only when the line-lock sync operation is performed.
- For more details, consult your local dealer.

9 H phase adjustment

For adjusting the horizontal phase when gen-lock (or H/V lock) operation is performed. Adjust with reference to other camera(s) in the system.

Notes:

- Gen-lock (or H/V lock) operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock (or H/V lock) operations are performed.
- For more details, consult your local dealer.

10 SC phase fine adjustment control

11 SC phase coarse adjustment switch

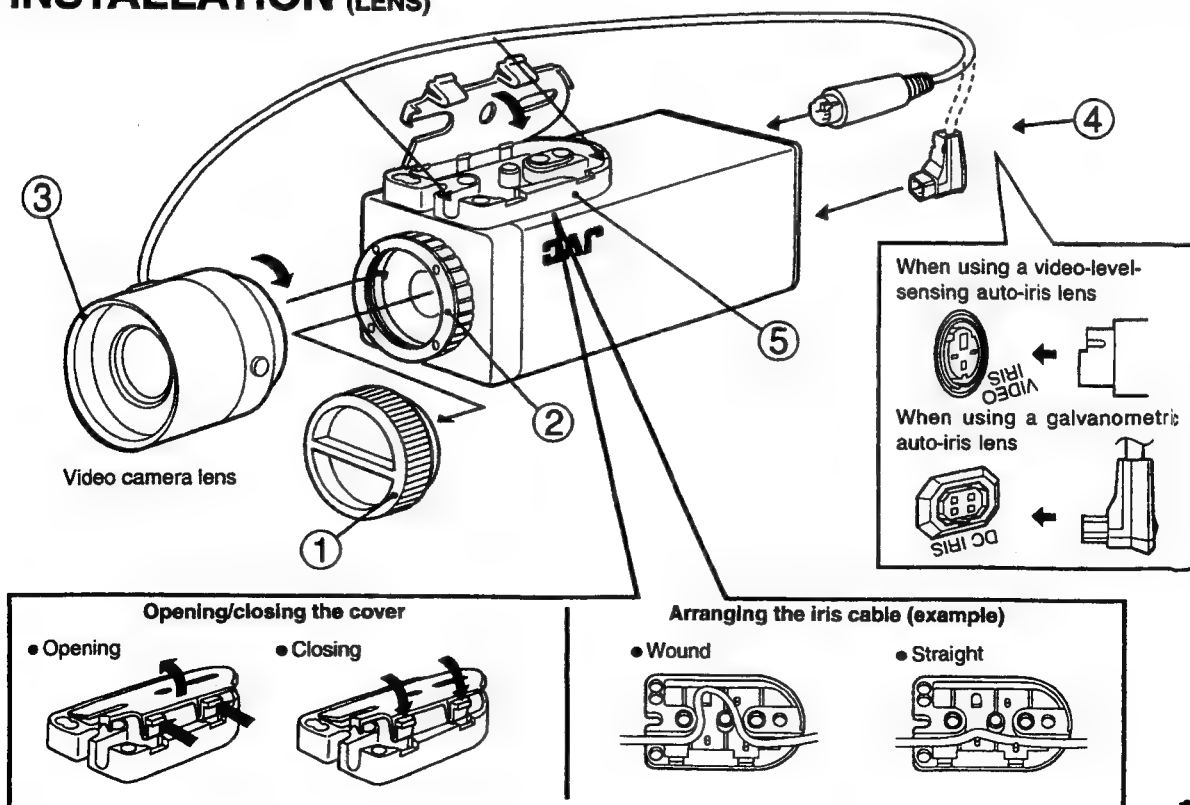
For adjusting the colour sub-carrier phase when gen-lock operation is performed. Adjust by changing the setting of the SC phase coarse adjustment switch (A/B) in conjunction with the SC phase fine adjustment control with reference to other camera(s) in the system.

Notes:

- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock operations are performed.
- For further details, consult your local dealer.

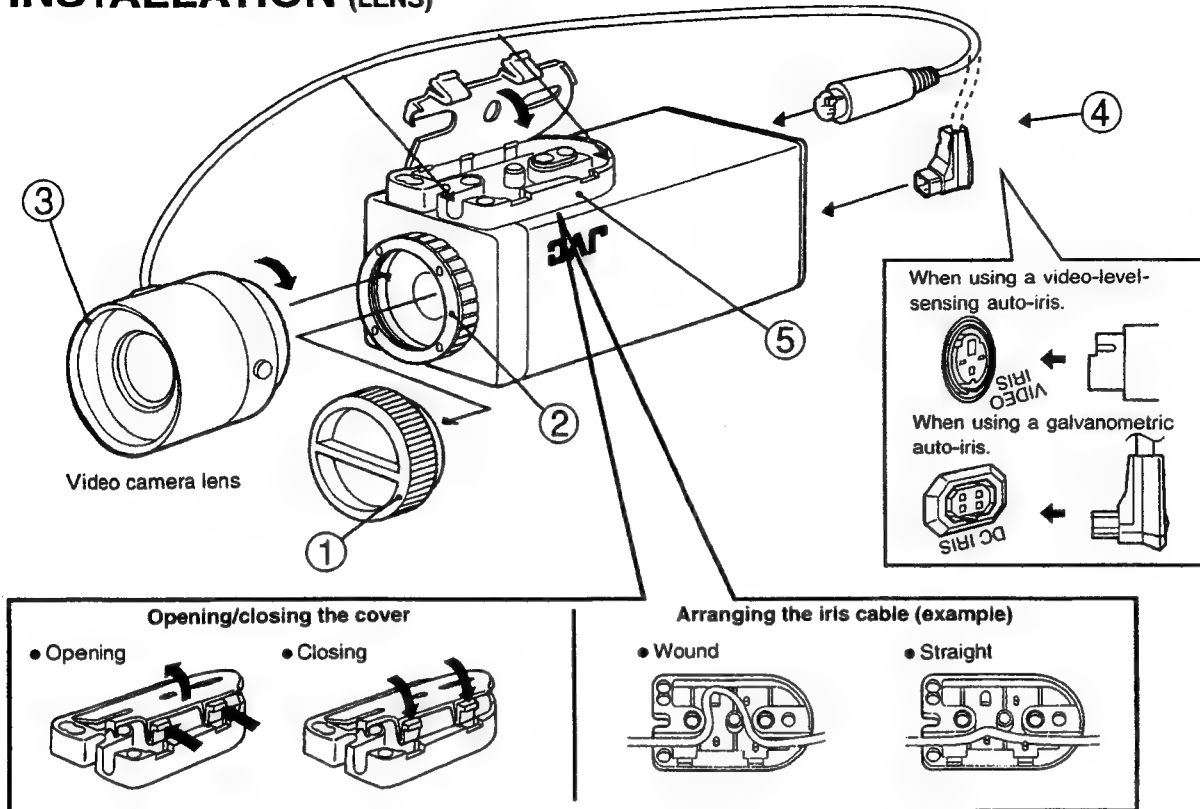
13

INSTALLATION (LENS)



13

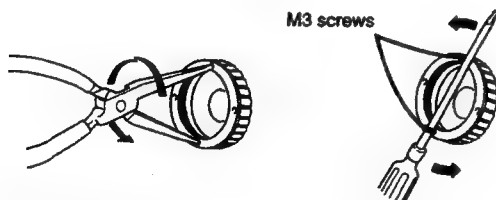
INSTALLATION (LENS)



14

Mounting a lens

- ① Unscrew the lens mount cap to remove it.
- ② Attach or remove the C-mount adapter depending on the lens to be used.
 - If the adapter is attached so tightly that is difficult to remove, use long-nosed pliers to remove it. Insert the tips of the pliers into the holes with no threads, then turn to remove. A screwdriver can also be used, as shown. Insert M3 screws into the holes so that the screwdriver has something to grip. (Use the same method when the adapter and lens are attached too tightly.)



- ③ Attach the lens to the lens mount. Secure it so that it does not become loose.
- ④ If the lens has an auto-iris mechanism, connect the iris cable to the VIDEO IRIS connector or DC IRIS connector.
 - When installing a video-level-sensing auto-iris lens, connect the lens cable to the VIDEO IRIS connector.
 - When installing a galvanometric auto-iris lens, connect the lens cable to the DC IRIS connector.

- ⑤ If the lens has an auto-iris mechanism, attach the auto-iris cable to the camera via the tripod mounting base (when the cable is too long).

Notes:

- Read the instruction manual of the lens carefully.
- If the auto-iris lens has a different type of plug, replace it with the plug provided.
- A cable with a diameter of 2 mm–4.5 mm can be secured with the tripod mounting base.
- When mounting a lens, it may require adjustment of the flange-back. Perform adjustment if necessary. See page 15.

Adjusting auto-iris lenses

Make this adjustment after connecting the camera to a power source and to a monitor.

- ① Set AGC switch to OFF.
 - ② When using a video-level-sensing auto-iris lens:

Adjust the LEVEL control of the lens to obtain optimum pictures.

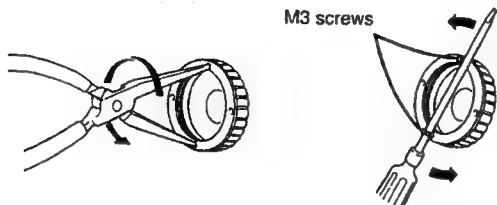
When using a galvanometric auto-iris lens:

Adjust the IRIS LEVEL control of the camera to obtain optimum pictures.
 - ③ Set AGC switch to ON
- It is recommended that the AGC be used in the ON position after adjusting the video LEVEL control.

14

Mounting a lens

- ① Unscrew the lens mount cap to remove it.
- ② Attach or remove the C-mount adapter depending on the lens to be used.
 - If the adapter is attached so tightly that is difficult to remove, use long-nosed pliers to remove it. Insert the tips of the pliers into the holes with no threads, then turn to remove. A screwdriver can also be used, as shown. Insert M3 screws into the holes so that the screwdriver has something to grip. (Use the same method when the adapter and lens are attached too tightly.)



- ③ Attach the lens to the lens mount. Secure it so that it does not become loose.
- ④ If the lens has an auto-iris mechanism, connect the iris cable to the VIDEO IRIS connector or DC IRIS connector.
 - When installing a video-level-sensing auto-iris lens, connect the lens cable to the VIDEO IRIS connector.
 - When installing a galvanometric auto-iris lens, connect the lens cable to the DC IRIS connector.

- ⑤ If the lens has an auto-iris mechanism, attach the auto-iris cable to the camera via the tripod mounting base (when the cable is too long).

Notes:

- Read the instruction manual of the lens carefully.
- If the auto-iris lens has a different type of plug, replace it with the plug provided.
- A cable with a diameter of 2 mm–4.5 mm can be secured with the tripod mounting base.
- When mounting a lens, it may require adjustment of the flange-back. Perform adjustment if necessary. See page 16.

Adjusting auto-iris lenses

Make this adjustment after connecting the camera to a power source and to a monitor.

- ① Set AGC switch to OFF.
 - ② When using a video-level-sensing auto-iris lens:

Adjust the LEVEL control of the lens to obtain optimum pictures.

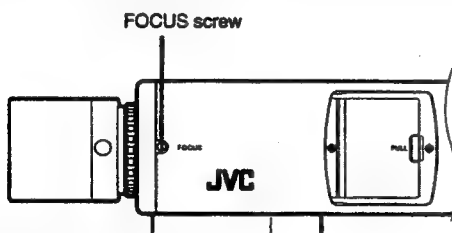
When using a galvanometric auto-iris lens:

Adjust the IRIS LEVEL control of the camera to obtain optimum pictures.
 - ③ Set AGC switch to ON
- It is recommended that the AGC be used in the ON position after adjusting the video LEVEL control.

15

Flange-back adjustment

When a lens is mounted, adjustment of the flange back (the distance from the lens mounting position to the focal point) may sometimes be required. Adjust when the correct focus cannot be obtained with the lens focus ring.



With a fixed-focus lens

- ① Fully open the aperture and set the focus ring to "∞" (infinity).
 - In the case of an auto-iris lens only, shoot a comparatively dark object so that the aperture is open.
- ② Turn the FOCUS screw to focus with a screwdriver.

Caution:

- Do not forcibly turn the FOCUS screw, as it will cause damage to the camera.

Note:

- When focusing, point the camera at an object that is more than 2000 times the focal length of the lens away from the front of the lens. (For example, if the focal length is 7.5 mm, the object should be more than 15 m away from the camera.)

With a zoom lens

- ① Fully open the aperture and set the lens to the maximum telephoto position. Then turn the focus ring to focus.
 - In the case of an auto-lens only, shoot a comparatively dark object so that aperture is open.
- ② Set the lens to its maximum wide-angle position.
- ③ Turn the FOCUS screw to focus with a screwdriver.
- ④ Repeat steps ① – ③ until the difference between focusing positions ① and ② becomes smallest.

Caution:

- Do not forcibly turn the FOCUS screw, as it will cause damage to the camera.

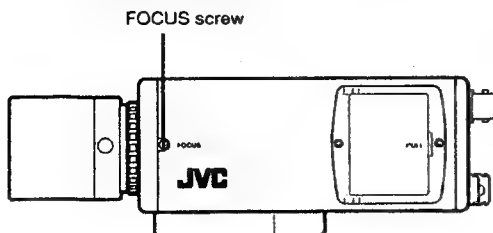
Note:

- When focusing, point the camera at an object that is more than 5 times the minimum focal distance away from the lens. (for example, if the minimum focal distance is 1m, the object should be more than 5 m away from the camera.)

15

Flange-back adjustment

When a lens is mounted, adjustment of the flange back (the distance from the lens mounting position to the focal point) may sometimes be required. Adjust when the correct focus cannot be obtained with the lens focus ring.



With a fixed-focus lens

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With a zoom lens

- ① Fully open the aperture and set the lens to the maximum telephoto position. Then turn the focus ring to focus.
 - In the case of an auto-lens only, shoot a comparatively dark object so that aperture is open.
- ② Set the lens to its maximum wide-angle position.
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- ④ Repeat steps ① – ③ until the difference between focusing positions ① and ② becomes smallest.

Caution:

- Do not forcibly turn the FOCUS screw, as it will cause damage to the camera.

Note:

- When focusing, point the camera at an object that is more than 5 times the minimum focal distance away from the lens. (for example, if the minimum focal distance is 1m, the object should be more than 5 m away from the camera.)

Lens that can be used

- The TK-1281EG can use 1/2", 2/3" or 1" video camera C-mount lenses when the C-mount adapter (standard accessory) is installed. When removed, 1/2" video camera CS-mount lenses can also be used.
- Use a suitable lens for the required area of view. The area of view for different focal lengths can be obtained using the following formulae. (Use as reference data, when the distance between camera and object is more than 100 times the focal length.)

In the case of using a 1/2" lens

$$\text{Height of the area of view (m)} = \frac{4.8 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

$$\text{Width of the area of view (m)} = \frac{6.4 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

Notes:

- Use video-iris lenses powered by DC 9 V–10 V with a power consumption of 50 mA or less.
- L in the illustration below should be as shown in the following table. If L exceeds the value in the table, it may damage the inside of the camera and correct mounting may be impossible; never use such lenses. Be sure not to attach the C-mount adapter when using a CS-mount lens.

Recommended focal point



Flange-back

| Lens | Flange-back | Distance L |
|-----------------|-------------|----------------|
| C-mount lens* | 17.526 mm | Less than 9 mm |
| CS-mount lens** | 12.5 mm | Less than 4 mm |

* With the C-mount adapter attached.

** With the C-mount adapter removed.

- Lenses designed for colour video cameras are recommended. Lenses designed for B/W cameras may have inferior colour reproduction and picture quality. In particular, they are not suitable for use outdoors or in very bright conditions. When using a lens with an ND filter attached, shooting may not be possible with the minimum required illumination specified.

Lens that can be used

- The TK-1180E can use C-mount lenses when the C-mount adapter (standard accessory) is installed. when removed, CS-mount lenses can also be used.
- Use a suitable lens for the required area of view. The area of view for different focal lengths can be obtained using the following formulae. (Use as reference data, when the distance between camera and object is more than 100 times the focal length.)

In the case of using a 1/3" lens

$$\text{Height of the area of view (m)} = \frac{3.6 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

$$\text{Width of the area of view (m)} = \frac{4.8 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

Notes:

- Use video-iris lenses powered by DC 9 V-10 V with a power consumption of 50 mA or less.
- L in the illustration below should be as shown in the following table. If L exceeds the value in the table, it may damage the inside of the camera and correct mounting may be impossible; **never** use such lenses. Be sure not to attach the C-mount adapter when using a CS-mount lens.

Recommended focal point



| Lens | Flange-back | Distance L |
|-----------------|-------------|----------------|
| C-mount lens* | 17.526 mm | Less than 9 mm |
| CS-mount lens** | 12.5 mm | Less than 4 mm |

Flange-back

- * With the C-mount adapter attached.
- ** With the C-mount adapter removed.

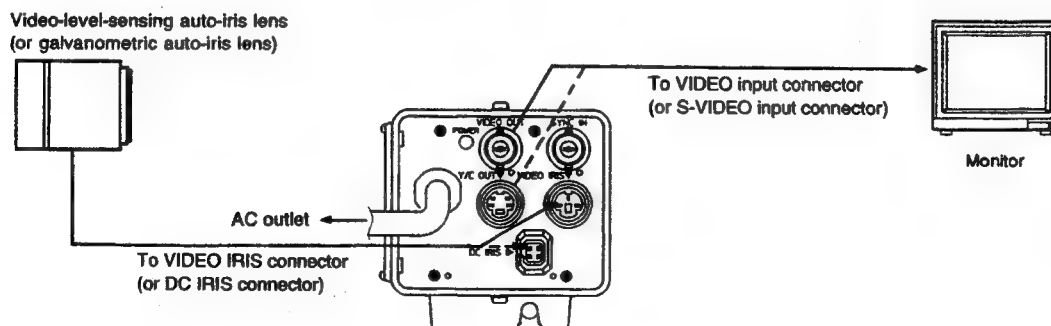
- Lenses designed for colour video cameras are recommended. Lenses designed for B/W cameras may have inferior colour reproduction and picture quality. In particular, they are not suitable for use outdoors or in very bright conditions. When using a lens with an ND filter attached, shooting may not be possible with the minimum required illumination specified.

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CONNECTION EXAMPLES

- Do not turn any component's power on until all connections are completed.
- Also read the instruction manuals of all the equipment used carefully.

Example 1: When a single camera is used

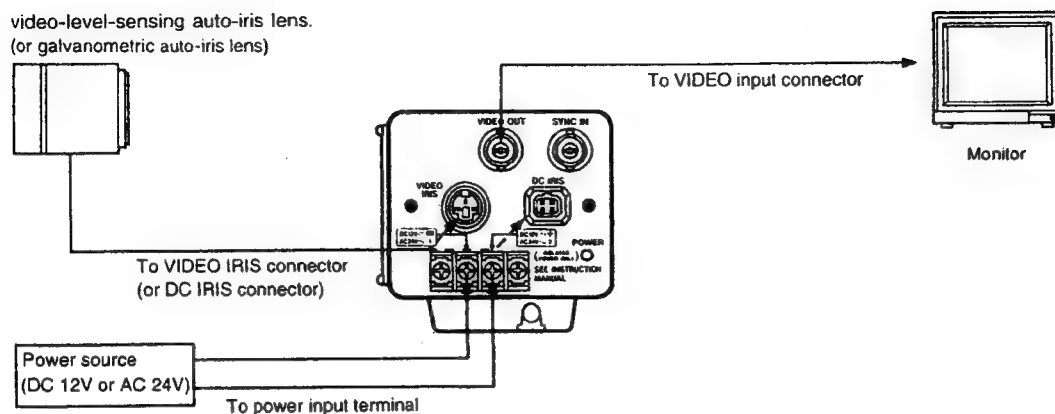


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CONNECTION EXAMPLES

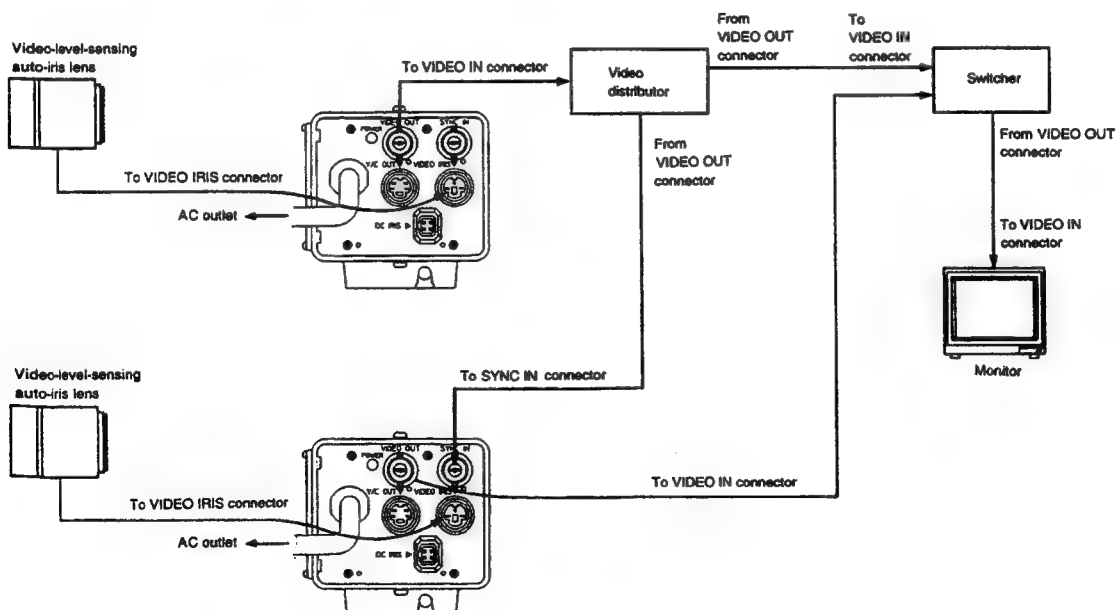
- Do not turn any component's power on until all connections are completed.
- Also read the instruction manuals of all the equipment used carefully.

Example 1: When a single camera is used



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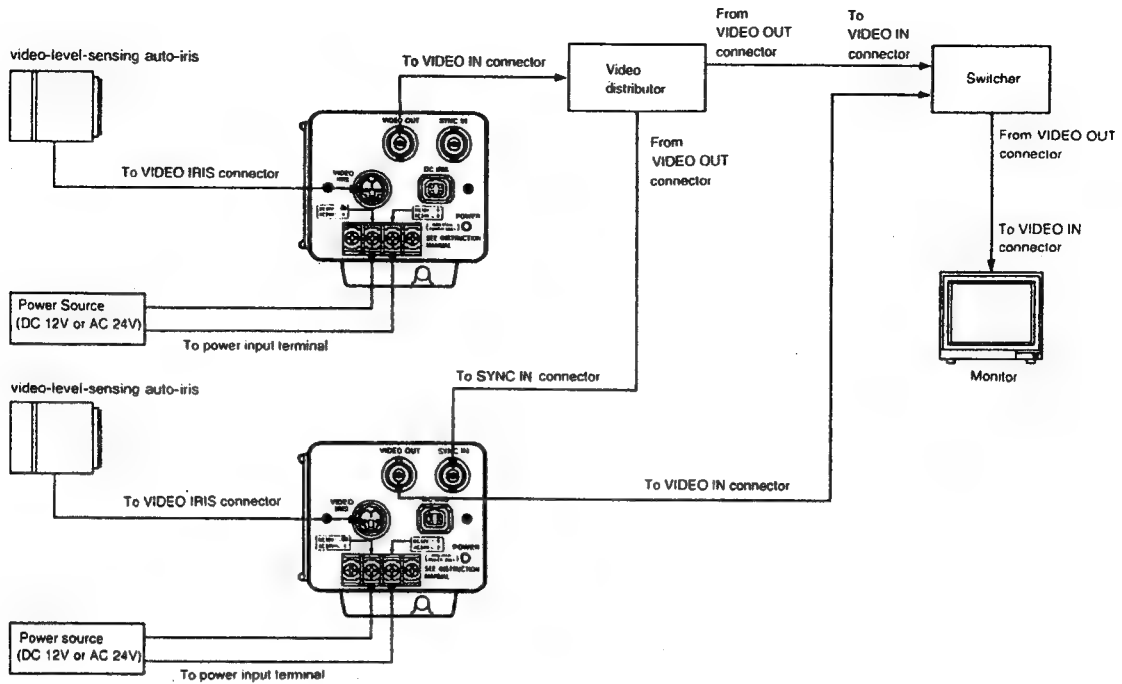
Example 2: When more than one camera is gen-locked



- For an example of connection showing line-lock operation, see page 6. Also, for the settings and adjustments required in line-lock operation, see page 11, 12.

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Example 2: When more than one camera is gen-locked



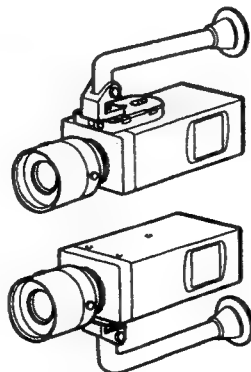
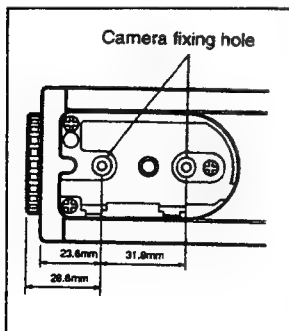
- For an example of connection showing line-lock operation, see page 6. Also, for the settings and adjustments required in line-lock operation, see page 12, 13.

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INSTALLATION (CAMERA)

Installation

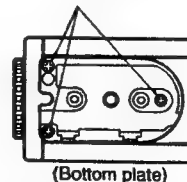
- Camera head can be installed on a tripod or a fixing part from the upper plate or the bottom plate by using the camera fixing hole (1/4", 20 UNC) on the tripod mounting base. The tripod mounting base has been installed on the bottom plate when shipped from factory. Move the tripod mounting base when installing the camera head from the upper plate.
- There are two camera fixing holes on the tripod mounting base. Use the two holes to increase the fixing intensity when installing the camera head specially.



Tripod mounting base movement

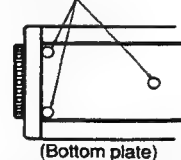
- 1 Remove the tripod mounting base fixing screw (black×3) to remove the tripod mounting base.

Tripod fixing screws



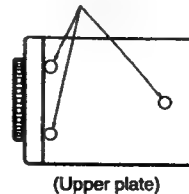
- 3 Attach the hole seals peeled off in step 2 onto the holes on the bottom plate attaching the tripod mounting base.

Hole seals



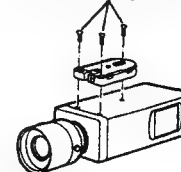
- 2 Peel off the hole seals on the upper plate. (Do not throw them away.)

Hole seals



- 4 Attach the tripod mounting base on the upper plate of the camera head with the tripod mounting base fixing screws (black×3).

Tripod fixing screws

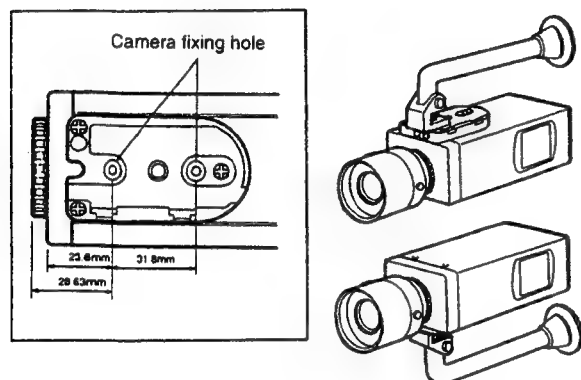


19

INSTALLATION (CAMERA)

Installation

- Camera head can be installed on a tripod or a fixing part from the upper plate or the bottom plate by using the camera fixing hole (1/4", 20 UNC) on the tripod mounting base. The tripod mounting base has been installed on the bottom plate when shipped from factory. Move the tripod mounting base when installing the camera head from the upper plate.
- There are two camera fixing holes on the tripod mounting base. Use the two holes to increase the fixing intensity when installing the camera head specially.



Tripod mounting base movement

| | |
|---|--|
| <p>① Remove the tripod mounting base fixing screw (black×3) to remove the tripod mounting base.</p> <p>Tripod fixing screws</p> <p>(Bottom plate)</p> | <p>③ Attach the hole seals peeled off in step ② onto the holes on the bottom plate attaching the tripod mounting base.</p> <p>Hole seals</p> <p>(Bottom plate)</p> |
| <p>② Peel off the hole seals on the upper plate. (Do not throw them away.)</p> <p>Hole seals</p> <p>(Upper plate)</p> | <p>④ Attach the tripod mounting base on the upper plate of the camera head with the tripod mounting base fixing screws (black×3).</p> <p>Tripod fixing screws</p> |

PRECAUTIONS (INSTALLATION)

- **Never expose the camera to rain or water.** Water can cause malfunctions and damage the camera.
- **Do not install the camera where the temperature could exceed the allowable range.** If used at extremely low or high temperatures, the camera could be damaged (allowable operating temperature range -10°C to +50°C).
- **Avoid installing in a humid or dusty place.** This could damage the camera.
- **Avoid installing in places where there is radiation.** This could damage CCD and other components and cause a malfunction.
- **Avoid installing in places where there are strong magnetic fields and electric signals.** The picture could be distorted.
- **Avoid installing in places where the camera would be subject to strong vibrations.** This could damage components and degrade the picture.

*Also read "PRECAUTIONS (USE)" on page 3 carefully.

PRECAUTIONS (INSTALLATION)

- **Never expose the camera to rain or water.** Water can cause malfunctions and damage the camera.
- **Do not install the camera where the temperature could exceed the allowable range.** If used at extremely low or high temperatures, the camera could be damaged (allowable operating temperature range -10°C to $+50^{\circ}\text{C}$).
- **Avoid installing in a humid or dusty place.** This could damage the camera.
- **Avoid installing in places where there is radiation.** This could damage CCD and other components and cause a malfunction.
- **Avoid installing in places where there are strong magnetic fields and electric signals.** The picture could be distorted.
- **Avoid installing in places where the camera would be subject to strong vibrations.** This could damage components and degrade the picture.

* Also read "Precautions (use)" on page 3 carefully.

21

SPECIFICATIONS

| | | | |
|--------------------------------------|--|---|--|
| Type | : Colour video camera | Recommended subject illumination | : 2000 lux |
| Signal system | : Based on PAL standard | Switching functions | : AGC (ON, OFF), Shutter mode (NORM, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, AUTO) White balance mode (MANU, Automatic, halogen lamp), BLC mode (ON, OFF), sync mode (LL (H/V), I/E) |
| Pickup element | : Interline-transfer system CCD solid-state image sensor (with complementary color filter) | Adjusting functions | : Flange-back, manual white balance (2 axes; G-Mg, R-B), V phase, H phase, SC phase, IRIS LEVEL control |
| Pickup colour system | : Single CCD complementary colour system | Lens mount | : C mount (with C-mount adapter)/ CS mount (without C-mount adapter) |
| No. of effective pixels | : 752 (H) \times 582 (V) | Power requirement | : 220 - 240 V AC, 50/60 Hz |
| Pickup area | : 6.4(H) \times 4.8 (V) mm | Power consumption | : 8.5 W |
| Scanning lines | : 625 lines, 2:1 interlaced | Operating temperature range | : -10°C to $+50^{\circ}\text{C}$ |
| Scanning frequency | : (H) 15.625 kHz (V) 50 Hz | Operating humidity | : Less than 90% Rh (noncondensing) |
| Sync system | : Internal, External, Line lock, H/V lock | Maximum external dimensions | : Approx. 69(W) \times 68(H) \times 220(D) mm (without lens mount cap) |
| Sync input | : Composite video signal (VBS)/ 1 Vp-p, 75 ohms terminated (or black burst signal (BB)) | Weight | : Approx. 1,220 g |
| Video output | : Composite video signal: 1 Vp-p, 75 ohms, unbalanced Separated Y/C video signals: Y/1 Vp-p, 75 ohms, unbalanced C/0.3 Vp-p (burst), 75 ohms, unbalanced | Cable length | : Approx. 2.4 m |
| Video S/N ratio | : 50 dB (2000 lux, AGC switch set to "OFF", at weighting) | | |
| Resolution | : 460 TV lines (horizontal) | | |
| Minimum required illumination | : 1.5 lux (f/1.2, AGC switch set to "ON") | | |

21

SPECIFICATIONS

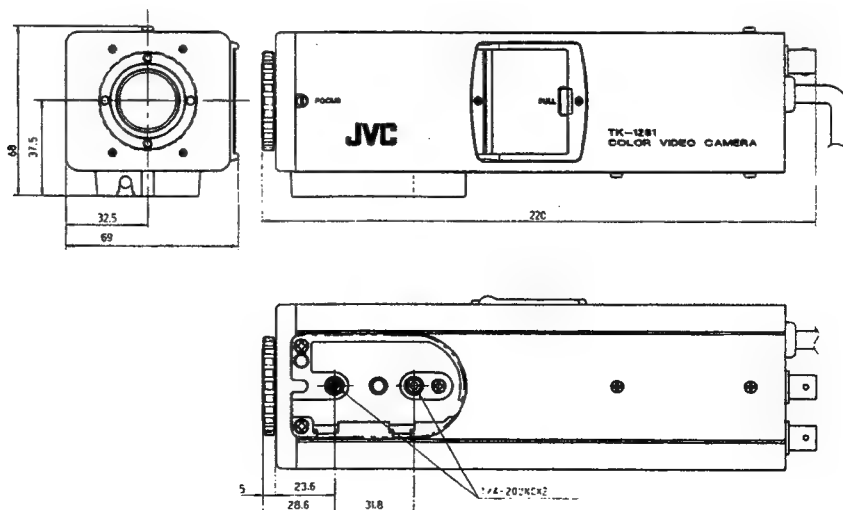
| | | | |
|--------------------------------------|---|---|--|
| Type | : Colour video camera head | Recommended subject illumination | : 2000 lux |
| Signal system | : Based on PAL standard | Switching functions | : AGC (ON, OFF), Shutter mode (NORM, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, AUTO), White balance mode (MANU, Automatic, halogen lamp), BLC mode (ON, OFF), sync mode (LL (H/V), I/E) |
| Pickup element | : Interline-transfer system CCD solid-state image sensor (with complementary colour filter) | Adjusting functions | : Flange-back, manual white balance (2 axes; G-Mg, R-B), V phase, H phase, SC phase, IRIS LEVEL control |
| Pickup colour system | : Single CCD complementary colour system | Lens mount | : C mount (with C-mount adapter)/ CS mount (without C-mount adapter) |
| No. of effective pixels | : 500 (H) × 582 (V) | Power requirement | : DC 12V or AC 24V, 50 Hz |
| Pickup area | : 4.8(H) × 3.6 (V) mm | Power consumption (max.) | : 0.6A (DC 12V) 6.5 W (AC 24V) |
| Scanning lines | : 625 lines, 2:1 interlaced | Operating temperature range | : -10°C to +50°C |
| Scanning frequency | : (H) 15.625 kHz (V) 50 Hz | Operating humidity | : Less than 90% Rh (noncondensing) |
| Sync system | : Internal, External, Line lock, H/V lock | Maximum external dimensions | : Approx. 69(W) × 65(H) × 150(D)mm (without lens mount cap) |
| Sync input | : Composite video signal (VBS)/ 1 Vp-p, 75 ohms terminated (or black burst signal (BB)) | Weight: | : Approx. 500 g |
| Video output | : Composite video signal: 1 Vp-p, 75 ohms, unbalanced | | |
| Video S/N ratio | : 46 dB (1000 lx, AGC switch set to "OFF", at weighting) | | |
| Resolution | : 330 TV lines (horizontal) | | |
| Minimum required illumination | : 2 lx (1/1.2, AGC switch set to "ON") | | |

22

Provided accessory : Iris plug (3-pin) × 1
Iris plug (4-pin) × 1
Y/C plug (4 pin) × 1

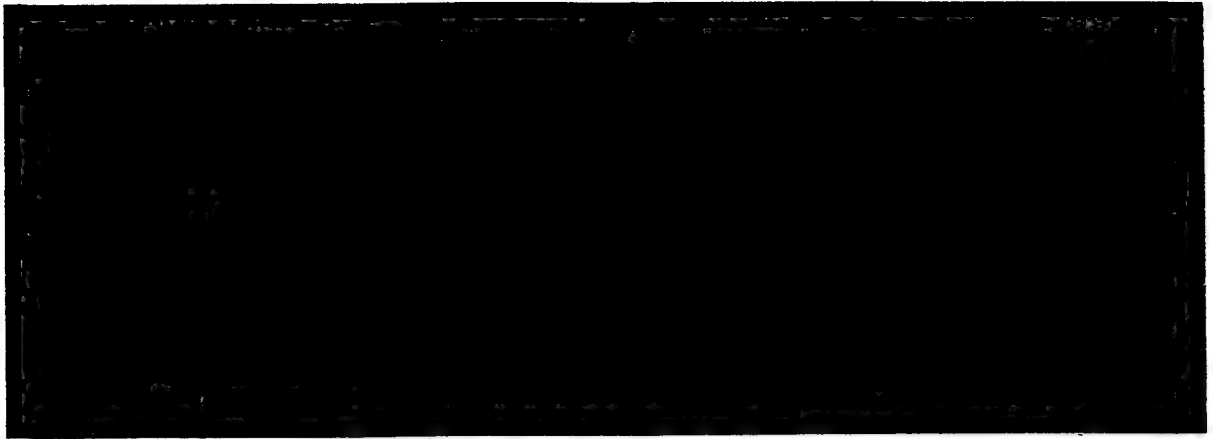
- Design and specifications subject to change without notice.
- This colour video camera is designed to output video signals conforming to the PAL standard, so that it cannot be used with video recorders or colour monitors which use colour systems other than PAL.

Dimensions (unit: mm)



Provided accessory Iris plug (3-pin) × 1
 Iris plug (4-pin) × 1

- Design and specifications subject to change without notice.
- This colour video camera is designed to output video signals conforming to the PAL standard, so that it cannot be used with video recorders or colour monitors which use colour systems other than PAL.



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MAIN PARTS LOCATION

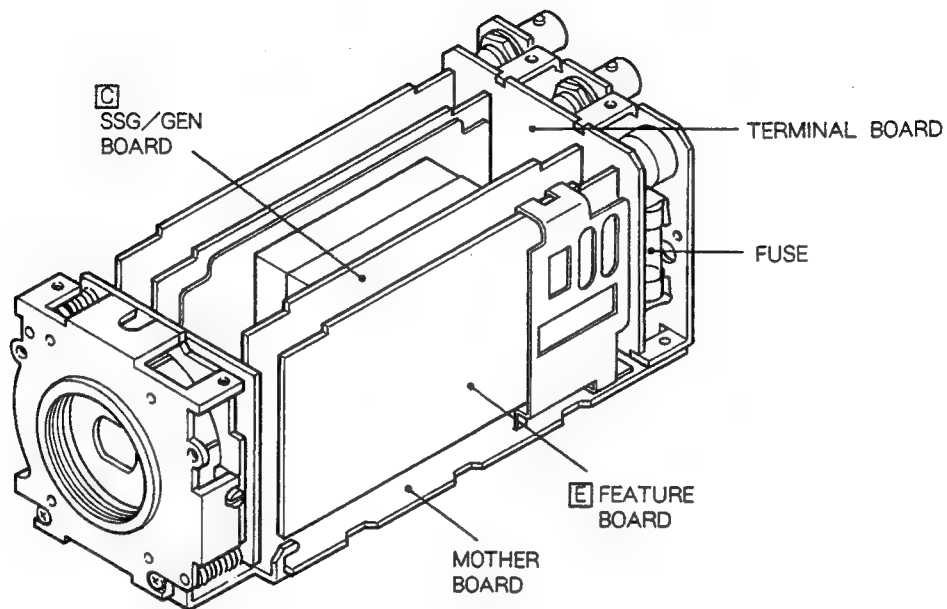


Fig. A

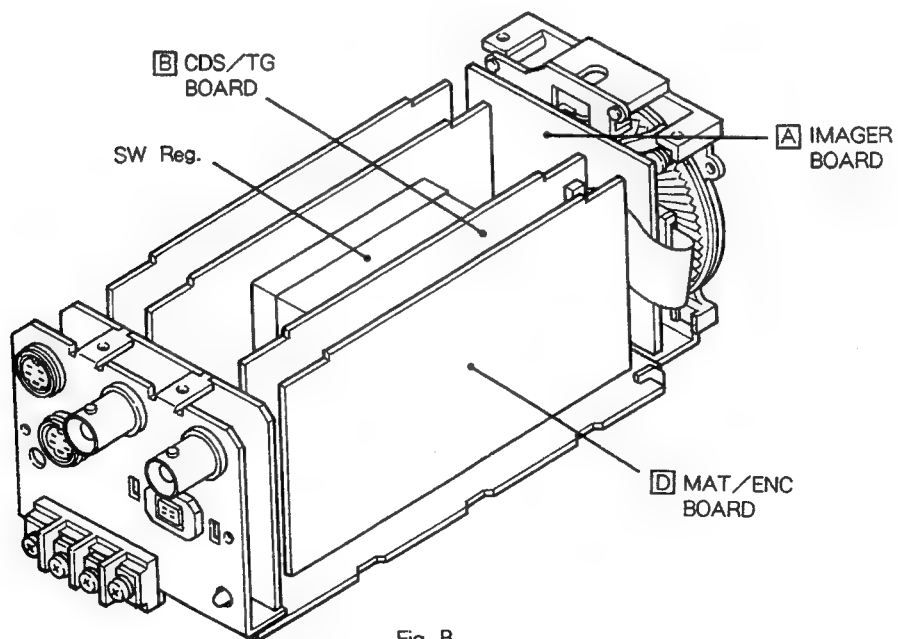


Fig. B

SPECIFIC SERVICE INSTRUCTIONS

■ TWO-SIDE HOLE-THROUGH PC BOARD

A two-sided hole-through PC Board is used on this camera. Patterns and wires are designed extra thin to attain highdensity component mounting. Rough handling may damage the patterns/wires or other components. When disassembling, repairing or adjusting the PC boards, exercise care to avoid damage.

■ REPAIRING CIRCUIT BOARD MODULES

(1) Removing circuit board module

Pull out the circuit board, after removing solder completely with a solder sucker.

NOTE:

- Take care not to damage or remove solder from other parts.
- If more than two circuit boards are removed, make sure that they are replaced in the proper position.
- Some circuit boards cannot be removed unless the shielding case and chassis frame have been removed. When removing any circuit board, check if this applies to the PC board.

(2) Checking circuit board module

To check each circuit board, take out the module and extend with wires, etc.

■ REPLACING CHIP COMPONENTS

Use a soldering iron (temperature 260~300°C. about 17W) with a slim tip and high insulating ability. those with a solder sucker (about 55W) are usually easier to use.

NOTE:

This video camera uses many mini-flat ICs. To remove these, melt the solder while picking up the individual pin with fine tipped tweezers or cut off the IC pins. Take care not to scratch or peel off the BOARD foil pattern.

■ CHIP COMPONENTS DISPLAY

Besides the resistors, short jumpers, FET's, ceramic capacitors, transistors, and other chip components, the chip tantalum capacitors and chip variable resistor (CH VR) are used on the camera. None of these chip components are reusable again once they have been used.

NOTE:

1. Avoid rough handling of the VR.
 2. Use a thin-tip insulated-type. screwdriver to adjust the CH VR.
- How to read printings

On certain chip components, printing is applied as follows:

① Chip metal glaze resistor (CH MG R)

The diagram shown in Fig. A ① is applied to some of these resistors.

Reading method (Example)

$$\begin{array}{c} 1 \quad 2 \quad 3 \\ \text{---} \quad \text{---} \quad \text{---} \\ \text{---} \quad \text{---} \quad \text{---} \end{array} = 12 \times 10^3 \text{ Unit: } [\Omega]$$

② Shorting jumper (0[Ω] of CH MG R)

No diagram is applied to shorting jumpers. A "0" is printed on Type ① shown in Fig. A

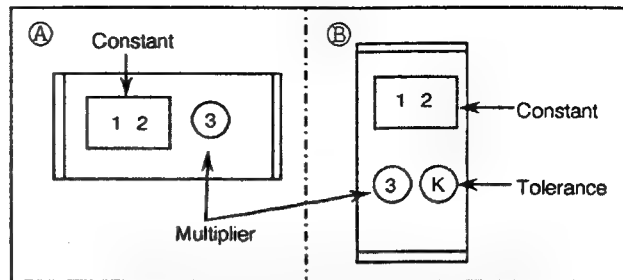


Fig.A Example of CH MG R / CH C Cap.codes

③ Chip ceramic capacitor (CH C Cap.)

- The diagram shown in Fig. A ② is applied to some of the CH C Caps. On some others, there is no diagram that is of any use to users.

Reading method (Example)

$$\begin{array}{c} 1 \quad 2 \quad 3 \quad K \\ \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \\ \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \end{array} = 12 \times 10^3 \text{ Unit: } [\mu F], \text{ Tolerance: } K(\pm 10\%)$$

- As shown in Fig. B some chip ceramic capacitors are represented by two digits. Table A shows how those figures should be read.

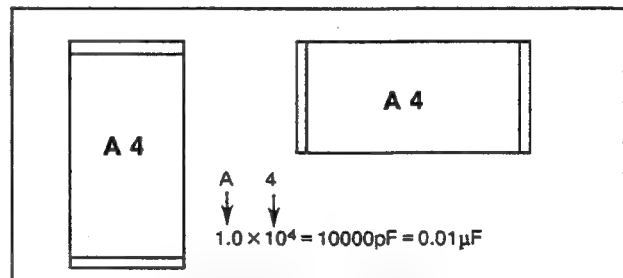


Fig.B Example of CH C Cap.codes

| | | | | | | | | | | |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----|-----|------------------|------------------|
| Alphabet | A | B | C | D | E | F | G | H | J | K |
| Constant | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 |
| Alphabet | L | M | N | P | Q | R | S | T | U | V |
| Constant | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.3 | 4.7 | 5.1 | 5.6 | 6.2 |
| Alphabet | W | X | Y | Z | | a | b | d | e | f |
| Constant | 6.8 | 7.5 | 8.2 | 9.1 | | 2.5 | 3.5 | 4.0 | 4.5 | 5.0 |
| Alphabet | m | n | t | y | | | | | | |
| Constnt | 6.0 | 7.0 | 8.0 | 9.0 | | | | | | |
| Numeral | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Multiplier | 10 ⁰ | 10 ¹ | 10 ² | 10 ³ | 10 ⁴ | 10 ⁵ | | | 10 ⁻² | 10 ⁻¹ |

Table A CH C Cap. capacity value

④ Chip Variable Resistor (CH VR)

A two-digit code is printed on some CH VRs.
They indicate a reading method, as shown in Table B.
Three-digit codes are also used. These codes are read in the same way as those for CH MG R.

⑤ Chip Tantalum Capacitor (CH Tan. Cap.)

The diagram shown in Fig.C is applied to some of the CH Tan. Caps.

Reading methd (Example)

The type shown in Fig.C is 10 μ F, 16WV chip tantalum capacitor.

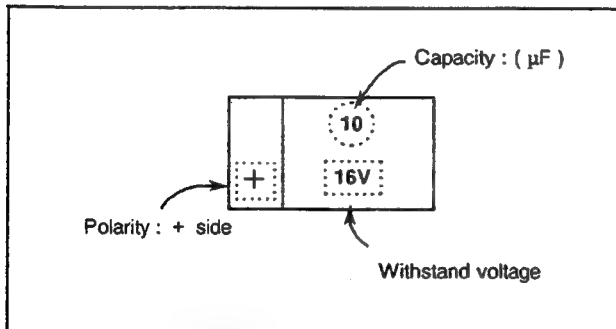


Fig.C Example of CH Tan. C Cap. codes

⑥ Chip Transistor

The labels shown in Table C are applied to the chip transistor

| Parts No. | Display method |
|----------------|---|
| 2SC2778(B,C,D) | <div>Ⓚ Ⓛ</div> <div>K.C K.D</div> <div>denotes</div> <div>2SC2778 parts ranking : B</div> |
| 2SC2404(D) | <div>U.D</div> |
| 32SD601(Q,R) | <div>Y.Q Y.R</div> |
| 2SD601A(Q,R) | <div>Z.Q Z.R</div> |
| 2SD1030(R) | <div>1ZR</div> |
| 2SB709(P,R) | <div>A.P A.Q A.R</div> |
| 32SB792(Q,T) | <div>I.Q I.R I.S I.T</div> |
| 2SB970(Q,S) | <div>1RQ 1RR 1RS</div> |
| 2SA1022(C) | <div>E.C</div> |

Table C Chip transistor labels

⑦ Chip FET

The following printing is applied to the Chip FET.

| Parts No. | Display method |
|-------------|--|
| 2SK198(Q,R) | <div>Ⓚ Ⓛ</div> <div>10R</div> <div>denotes</div> <div>2SK198 parts ranking : Q</div> |
| 2SK316 | <div>1KP 1KQ</div> |

Table D Chip FET codes

⑧ Chip Diode

The following labels are applied to the Chip Diode.

| Parts No. | Display method |
|--------------|--|
| MA151WA | <div>Ⓜ N</div> <div>denotes</div> <div>MA151</div> |
| MA151K | <div>M.H</div> |
| MA151WK | <div>M.T</div> |
| MA151A | <div>M.A</div> |
| MA157 | <div>M.R</div> |
| MA3051 | <div>5.1</div> |
| MA3120 (L-H) | <div>12H 12L 12M</div> |

Table E The display of chip diode

| | | | | | | | | | | | |
|------------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|
| Code | 12 | 22 | 32 | 52 | 72 | 13 | 23 | 33 | 54 | 73 | 14 |
| Resistance Value | 100 Ω | 220 Ω | 330 Ω | 470 Ω | 680 Ω | 1k Ω | 2.2k Ω | 3.3k Ω | 4.7k Ω | 6.8k Ω | 10k Ω |
| Code | 24 | 34 | 54 | 74 | 15 | 25 | 35 | 55 | 75 | 16 | |
| Resistance Value | 22k Ω | 33k Ω | 47k Ω | 68k Ω | 100k Ω | 220k Ω | 330k Ω | 470k Ω | 680k Ω | 1M Ω | |

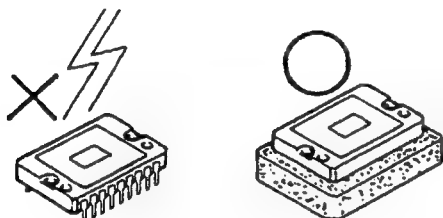
Table B CH VR resistance value display method in two-digit

■ "CHARGE COUPLED DEVICE (CCD) "IMAGER

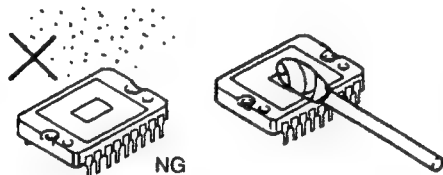
1 Precautions for handling and replacing CCD imager

CCD is characteristic of many advantages, but it also has some disadvantages. The following are measures to deal with these disadvantages.

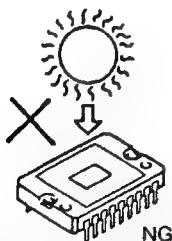
- (1) CCD imager is a circuit element which is very sensitive to static electricity.
- The potential differences caused by the electrostatic charge-which have been accumulated in the clothing and human body-sometimes destruct the insulation of the CCD imager. Therefore, handle the "high-priced" CCD imager with more attention thereto than to the C-MOS (Complementary MOS), especially during the dry season and in dry places.



- Maintain the CCD imager in the provided pack or aluminum foil so that it can be kept at the same potential. Never unpack its container until the very moment of servicing.
- (2) The CCD imager is easily damaged by dust. Also it suffers considerable deterioration, when exposed to strong light.
- When servicing, make sure that the CCD imager is kept free from such foreign material as dust. Use dry soft cloth or soft cloth moistured with ethyl alcohol to wipe off the foreign material.



- Do not exposed the CCD imager to such strong light as direct sunlight.



- (3) CCD imager is damaged instantly by the following malfunctions. Pay close attention to these malfunctions before servicing

- ① After removal of CCD, charge may remain at each terminal in the circuit side for some time. In this situation, when CCD is inserted to the socket, CCD may be distracted instantaneously due to the charge. To avoid this, CCD should be inserted with passage of some time (2 to 3 minutes) after removal.

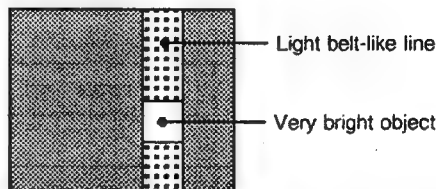
■ SPECIAL CHARACTERISTICS OF A CCD

The following phenomena can be expected when using the video camera with the CCD imager; they are not malfunctions.

• Smear phenomenon

This phenomenon occurs when shooting a very bright object (such as electronic light, fluorescent lamp, the sun or a strong reflection).

Video monitor screen.



Due to the interline-transfer organization of the CCD image sensors (Refer to "The Interline-transfer Organization of the CCD Image Sensors"), this phenomenon is caused by electronic charges generated beneath the photosensors by a light with a long wavelength, such as an infrared light.

In the shutter mode, as the signal level drops down to 1/20, the smear level becomes high relatively. However this means no failure.

• False signal

When vertical stripes or straight lines are shot, they may look wavy.

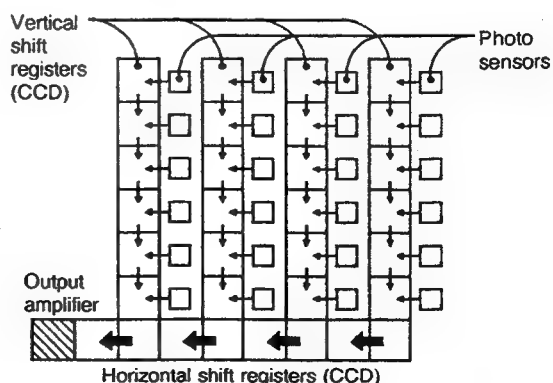
• Blemishes

The photosensor elements generate electronic charges which ultimately produce horizontal and vertical rows in the CCD image sensor.

Therefore, any malfunctioning photosensor element will eventually cause a blemish on the monitor screen.

The interline-transfer organization of CCD image sensors

This CCD video camera module adopts an interline transfer organization in which precisely aligned photosensors and vertical shift registers are arrayed interlinearly and horizontal shift register links up with the vertical shift register, as shown. Light variations are sensed by the photosensors, which generate electronic charges proportional to the light intensity. The generated charges are fed into the vertical shift registers all at one. The charges are then transferred from the vertical shift registers to the horizontal shift registers successively and finally reach the output amplifier to be read out successively.



■ DISASSEMBLY PROCEDURE

- Be sure to turn OFF power before disassembly of parts.

1. Removal of Casing Parts

1-1 Removing the rear cover

- (1) Remove the two screws (A) shown in Figure 1.

1-2 Removing the tripod base

- (1) Remove the three screws (B) in Figure 1.

1-3 Removing the aluminum case

- (1) Remove the screw (C) in Figure 1.
- (2) Pull out the case in following the arrow.

1-4 Removing the front die casting

- (1) Remove the C mount adapter.
- (2) Remove the four screws (D) in Figure 1.

1-5 Removing the side cover

- (1) Remove the two screws (E) in Figure 1.
- You may remove the aluminum case without removing the side cover.

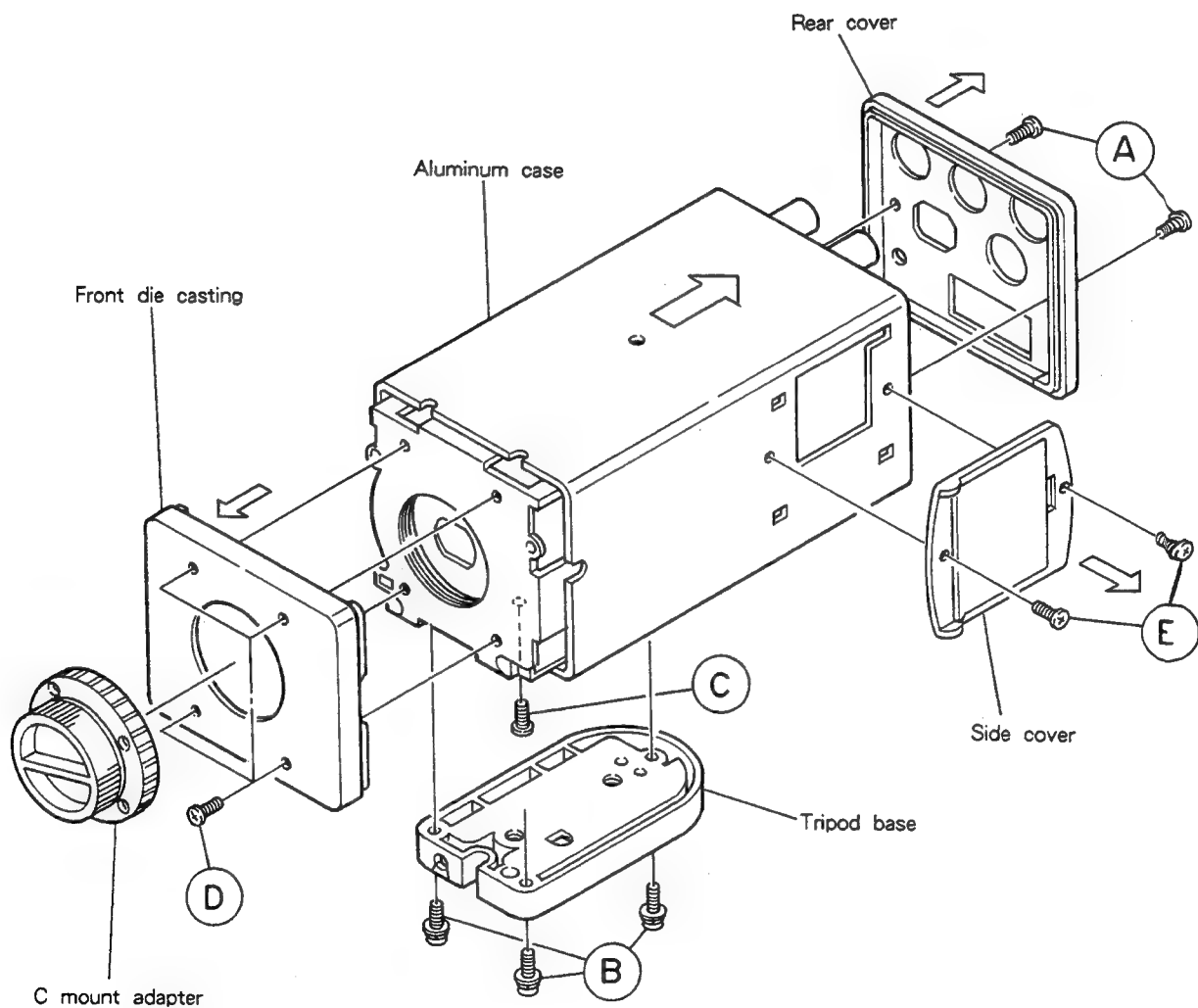


Figure 1 removing the casing parts

2. Removal of Chassis Parts

* First remove the casing parts.

2-1. Removing the top frame

- (1) Remove the four screws (F) in Figure 2.
- (2) Then the two PB holders will be removed at the same time.

2-2. Removing the chassis mount

- (1) Remove the flexible wire in Figure 3. (Pull the stopper in the direction of the arrows.)
- (2) Remove the two screws (G) in Figure 2.

2-3. Removing the rear terminal assembly

- (1) Remove the two screws (H) in Figure 2.

2-4. Removing the bottom frame

- (1) Remove the two screws (I) in Figure 2.
- (2) Move the frame in the direction of the arrow and remove it.
- (3) The side shield will then be removed at the same time.

2-5. Removing the module boards

- (1) Remove the top frame and the side shield.
- (2) Pull out each module upward and remove it.

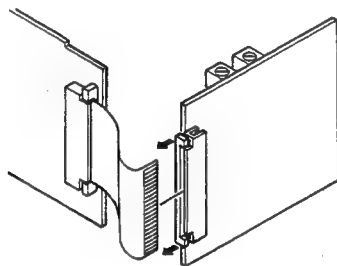


Figure 3 Removing the flexible wire

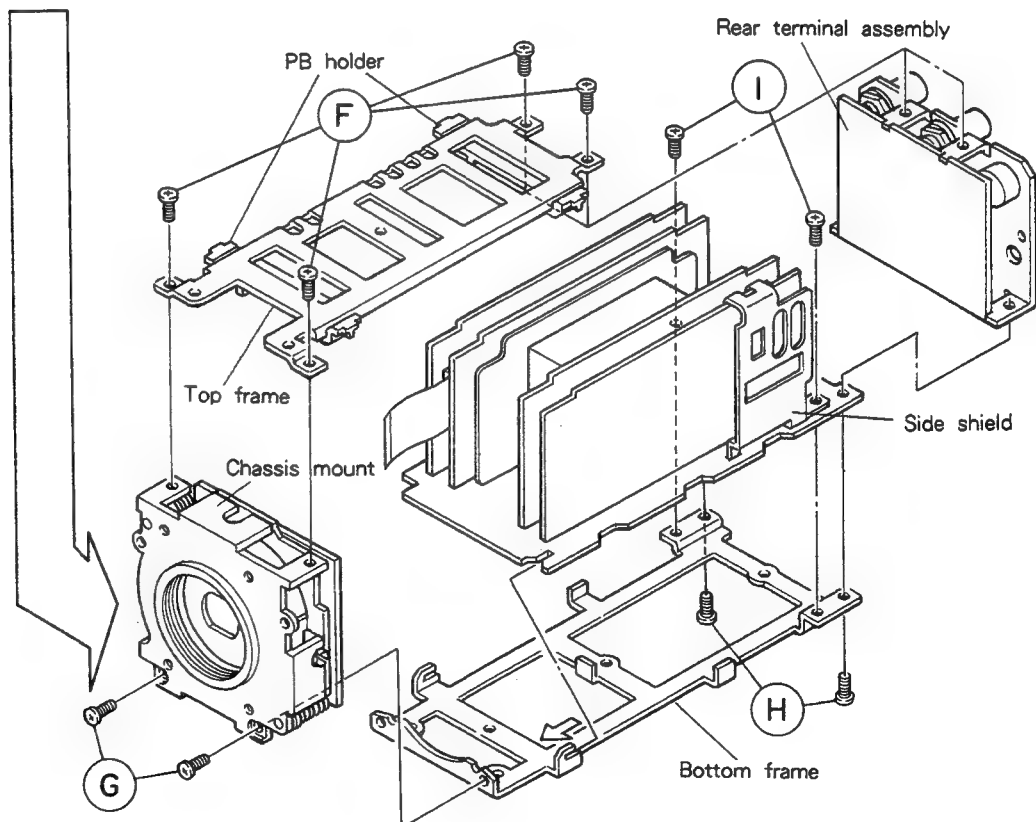


Figure 2 Removing the chassis parts

3. Replacement of the CCD Imager

- (1) Follow Paragraph 2-2 or the removal of the chassis mount to remove the chassis mount.
- (2) Remove the two screws (J) shown in Figure 4.
- (3) Pull out the imager module board in following the arrow and remove it from the chassis mount.
- (4) Remove the two screws (K) in Figure 4 and remove the LPF holder and the low-pass filter.
- (5) Remove the two screws (L) in Figure 4 and remove the CCD holder, CCD mask, and CCD imager.
- (6) After replacement, install a CCD imager with the hole on the back of it facing upward. (See Figure 5.)

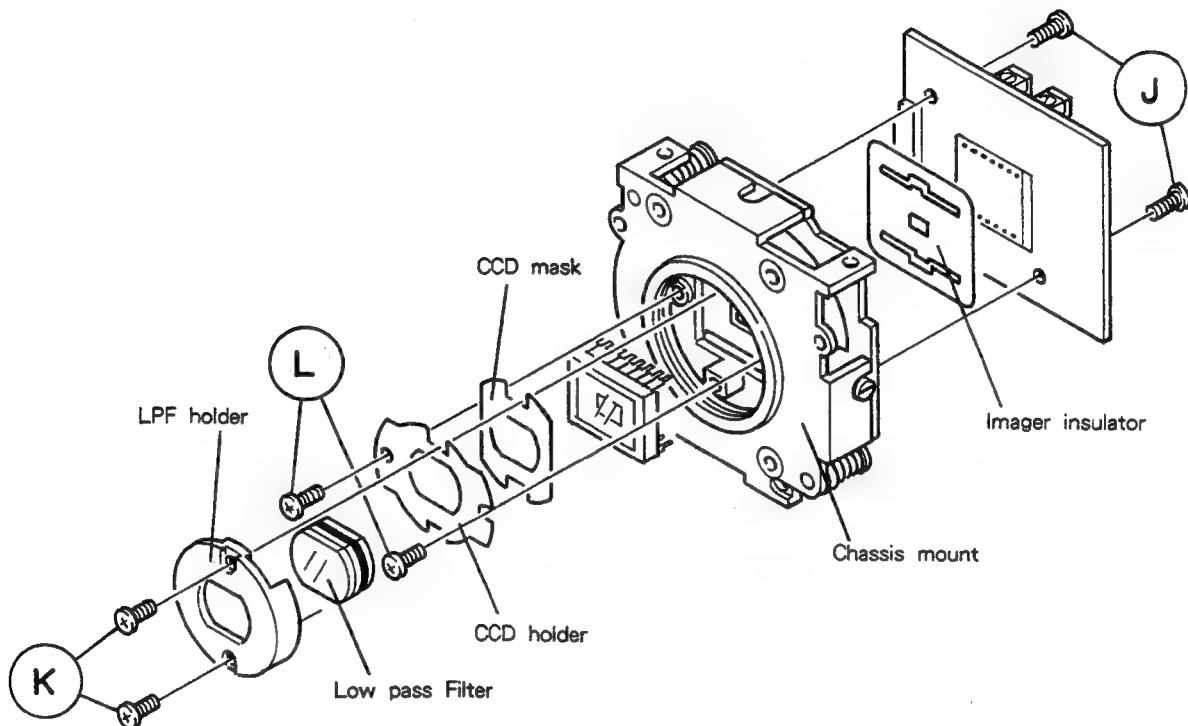


Figure 4 Replacing the CCD imager

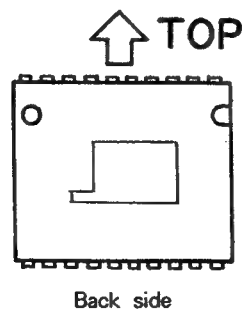


Figure 5 CCD direction

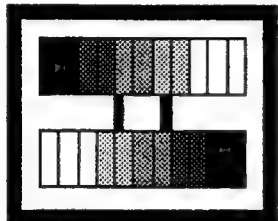

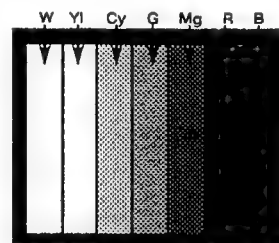
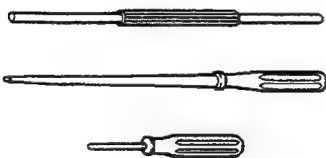

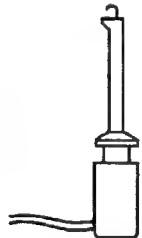
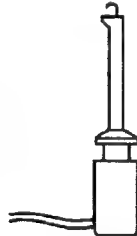
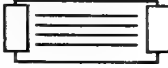
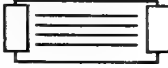
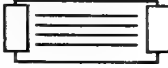
SERVICE ADJUSTMENT

TOOLS AND FIXTURES ADJUSTMENT

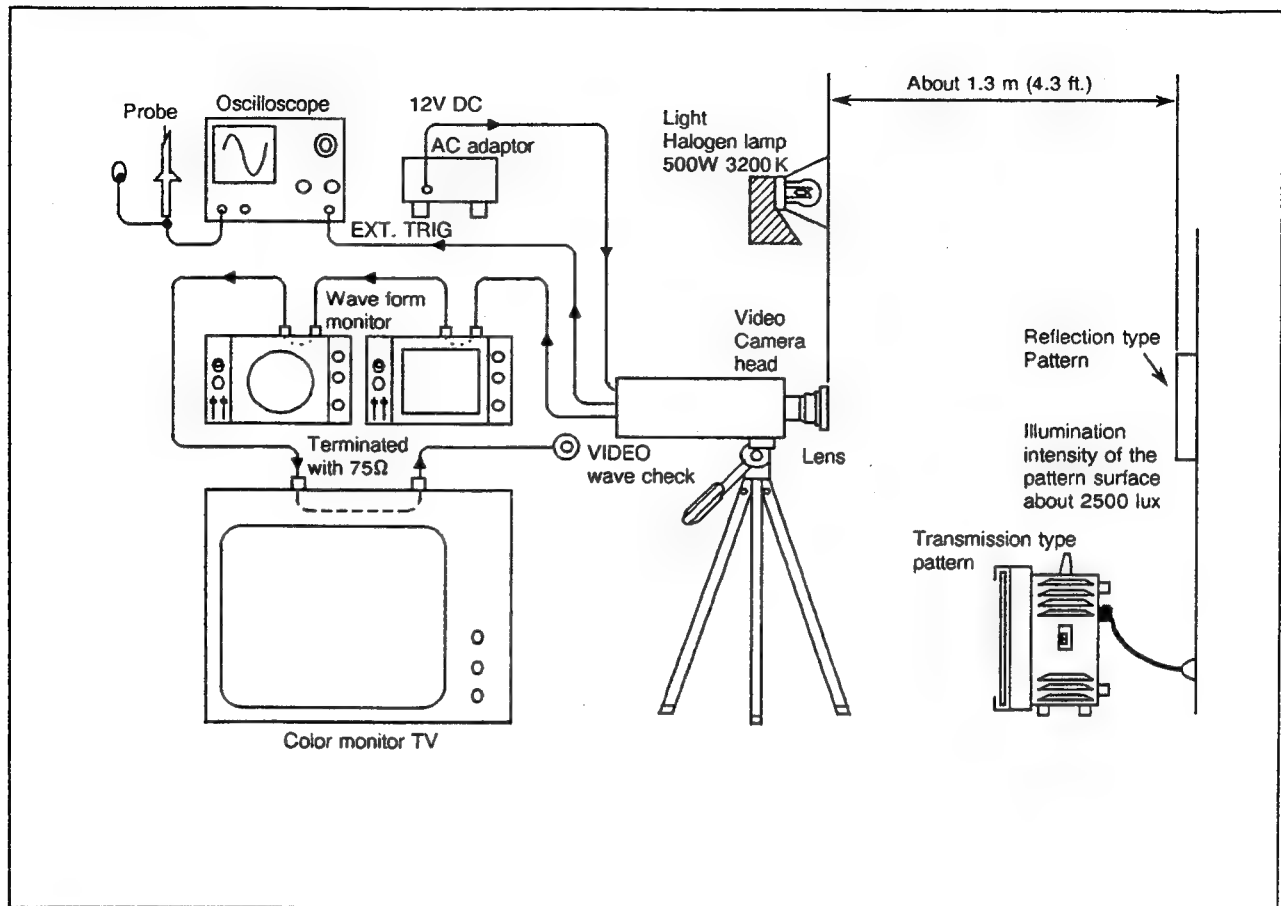
■ MEASURING INSTRUMENTS

- | | | | |
|--------------------------------------|--------|--------------------------------------|---|
| 1. Oscilloscope | 1 | 6. Power supply | 1 |
| 2. Color monitor TV (PAL-type) | 1 | Voltage: 12 V DC (for 1280E/1180E) | |
| Color temperature : 9,300K | | 7. Vectorscope (PAL-type) | 1 |
| 3. Lights | 1 or 2 | Used only if necessary. | |
| Color temperature : 3,200K | | 8. Waveform monitor (PAL-type) | 1 |
| 4. Frequency counter | 1 | Used only necessary. | |
| 5. DIGITAL DC voltmeter(DVM). | 1 | | |

■ TOOLS AND FIXTURES

| 1.Patterns | | (Gray scale Pattern) | (White Pattern) | (Color bar Pattern) | | | | |
|--|--------------------------------|---|--|--|---|--------------------------------|---|--------------------|
| <p>Note: Reflection-type patterns eventually suffer from drops in signal output level or loss of output uniformity.Periodic replacement is recommended.</p> | |  <p>GS-2A* Reflective type($\gamma = 2.2$)</p> |  <p>WC-2A* Reflective type</p> |  <p>CC-2T* Transmissive type</p> | | | | |
| 2.DRIVERS | | 3.COLOR TEMP.CONVERSION FILTER | | 4.PIN CLIP | | | | |
|  <p>Adj. driver</p> | |  <p>CC-12G</p> <p>Kenko filter, C10,C8, W4,W2,C12 KODAK Wratten gelatin filter, CC-12G</p>  <p>C10 + C8 W4 + W2 C12</p> | |  <p>Slightly bending the pin tip facilitates its use.</p> | | | | |
| 5.LENS | | 6.MODULE EXTENSION JIG | | | | | | |
| <p>C-mount lens or CS-mount lens.Iris can be controlled manually.</p> <ul style="list-style-type: none">• Lens flange-back should be standard• Zoom lens is recommended• F1.4 lens is recommended. | | <table><tr><td></td><td>PIN 24pin 22pin 18pin</td><td>JIG No. SC45283-00A* SC45283-00B* SC45283-00C*</td><td>QTY 2 1 2</td></tr></table> <p>If necessary, please extend PWB and use it to check voltage.</p> | | |  | PIN 24pin 22pin 18pin | JIG No. SC45283-00A* SC45283-00B* SC45283-00C* | QTY 2 1 2 |
|  | PIN 24pin 22pin 18pin | JIG No. SC45283-00A* SC45283-00B* SC45283-00C* | QTY 2 1 2 | | | | | |
| | | <p>Note: Order parts marked with an asterisk (*) in the same way as other general parts. Parts that is not marked with asterisk (*) are able to get at your side.</p> | | | | | | |

PRIOR TO STARTING ADJUSTMENT



(1) Warming up

Before adjustment, turn on the camera to warm it up for more than 10 minutes so that the camera operation may be stabilized.

(2) Lighting

- Adjust the distance between the light and pattern so that the illumination on the pattern is about 2,500 lux and the illumination over the entire pattern surface is as uniform as possible.
- Correct adjustment will be impossible if the illumination is too high, too low or uneven.

(3) About CCD Imager

The CCD imager is susceptible to static electricity. The insulator of this element might be damaged if a potential difference is caused by the electrostatic charge carried by clothes or body. Be careful when holding it because it is costly. Use special care in a dry atmosphere in a dry season.

1. Presetting

Before adjustment, preset the following switches :

- 1) INT/EXT-L/L switch → "I/E"
- 2) AGC switch → "OFF"
- 3) White Balance switch → "※" (in-door)
- 4) SHUTTER → "NORM" (OFF)
- 5) BLC → "OFF"

2. In holding a test pin with a probe, take care set contact with any other pin. The CCD imager will be damaged if some test pins are accidentally connected.

3. EXT. TRIGGER

In adjusting the signal system, extract the trigger signal as required.

H-rate : TP-11 (ID) [MAT/ENC Board]

V-rate : IC302 Pin ⑦ [FEATURE Board]

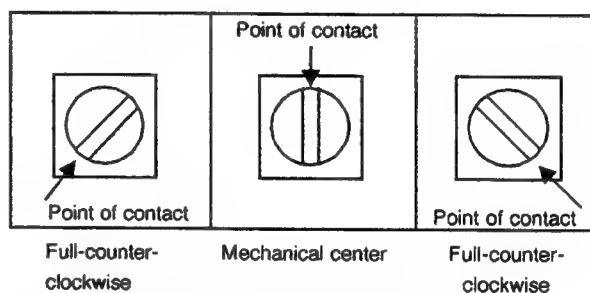
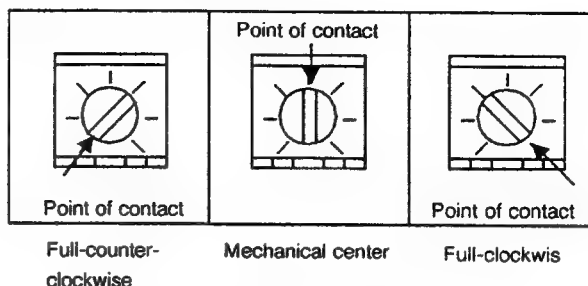
4. JUST SCAN

Unless otherwise specified, apply "just scan" to all pattern adjustments.

5. Repeat adjustments optimum conditions are established.

6. Chip VR

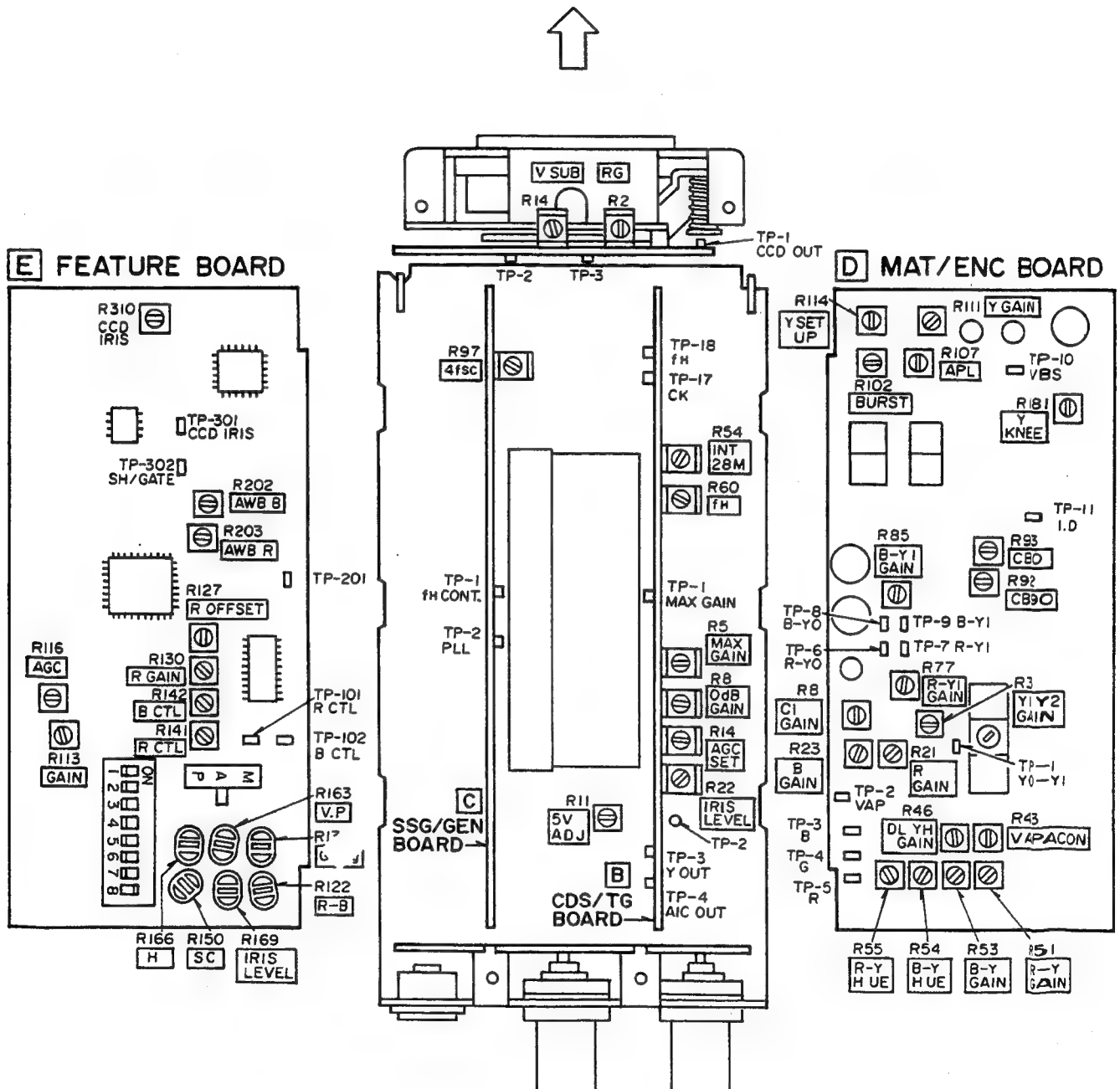
Chip VR rotating position is designated as shown in the figure below for the convenience of explanation, since the chip VR can be rotated 360°.



7. No Adjustment of unspecified VRs

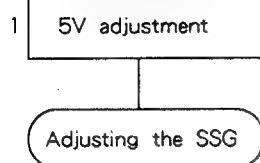
Never rotate VR's other than those specified by this instruction Manual.

ADJUSTMENT LOCATIONS

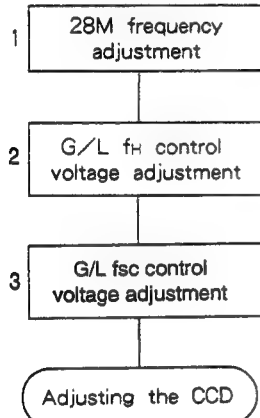


ADJUSTING STEPS

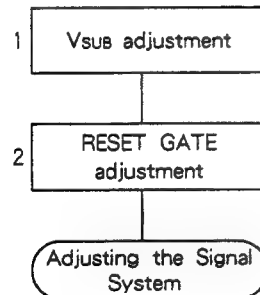
1. Adjusting the Voltage



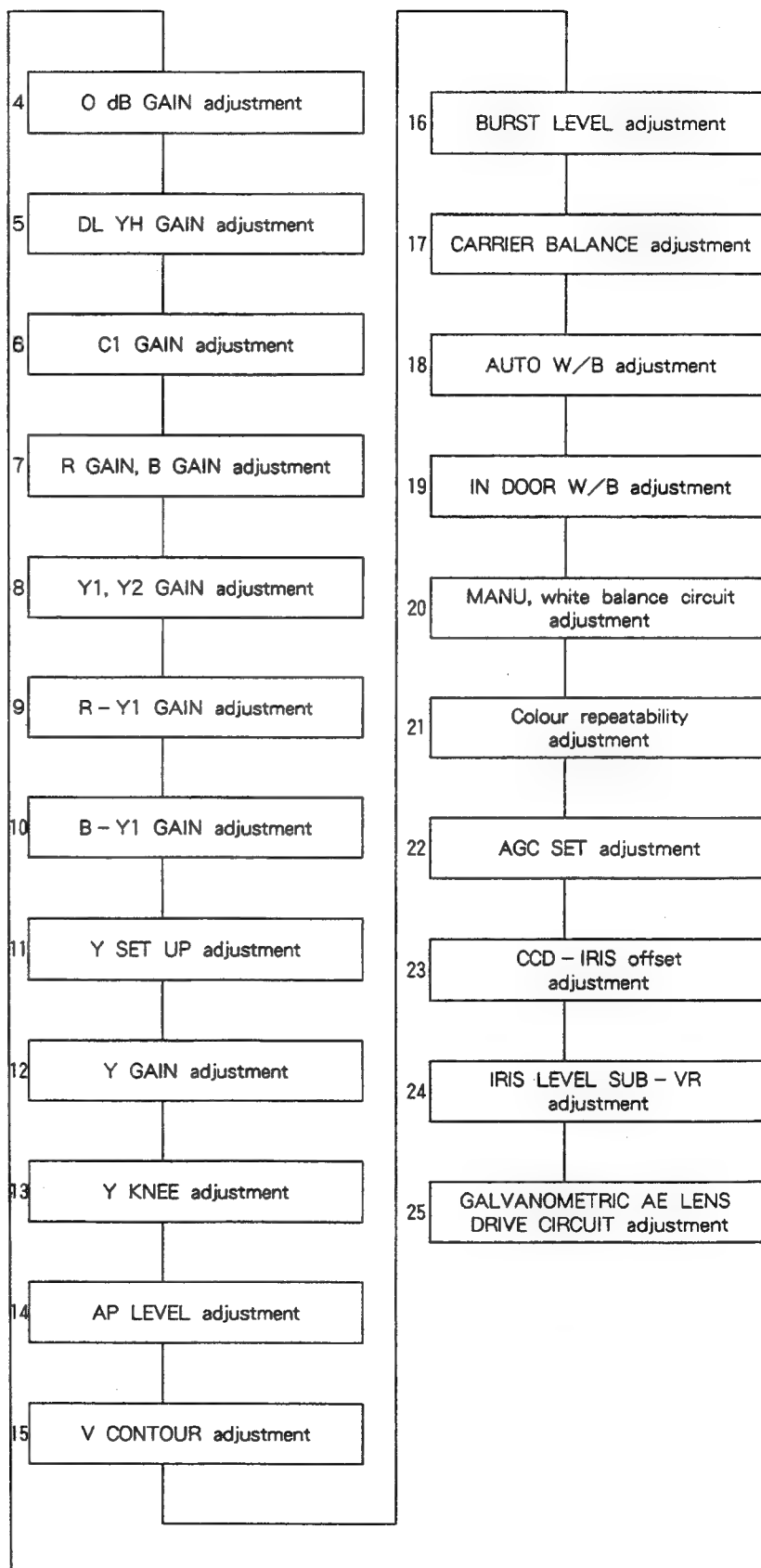
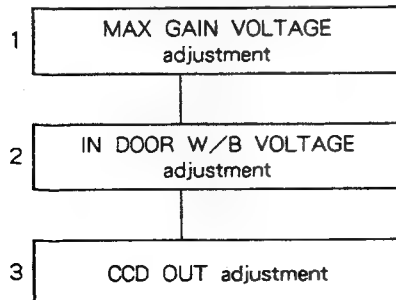
2. Adjusting the SSG



3. Adjusting the CCD



4. Adjusting the Signal System




1. Adjusting the Voltage

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|---------------|-------------------|-------------------------------|--------------------------------|--|
| 1 | 5V adjustment | Digital voltmeter | TP - 2 (5V) [Mother board] | R11 (5V ADJ) [Mother board] | 1. Connect digital voltmeter to TP - 2 (5V) 2. Set the voltage to 5.0V with R11 (5V ADJ). |

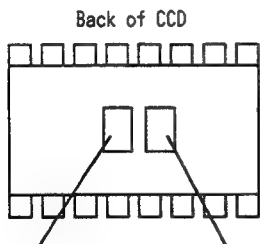
2. Adjusting the SSG

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|--------------------------------------|--------------|---|-----------------------------------|---|
| 1 | 28M frequency adjustment | Oscilloscope | TP - 17 [CDS/TG board] | R54 VR (28MADJ) [CDS/TG board] | 1. Connect a frequency counter to TP - 17. 2. Adjust the frequency to $28.6375 \text{ MHz} \pm 10 \text{ Hz}$ with R54 (28MADJ). |
| 2 | G/L f_H control voltage adjustment | Oscilloscope | TP - 18 [CDS/TG board] (or TP - 1 [SSG/GEN board]) | R60 (f_H) [CDS/TG board] | 1. Connect an oscilloscope probe to TP - 18. 2. Connect an external SYNC and establish GEN LOCK or LINE LOCK operation. 3. Adjust the voltage to $2.5\text{V} \pm 0.1\text{V}$ with R60 (f_H) VR. |
| 3 | G/L fsc control voltage adjustment | Oscilloscope | TP - 2 [SSG/GEN board] | R97 (4 fsc) [SSG/GEN board] | 1. Connect an oscilloscope probe to TP - 2. 2. Connect an external SYNC and establish GEN LOCK or LINE LOCK operation. 3. Adjust voltage to $3\text{V} \pm 0.1\text{V}$ with R97 (4 fsc) VR. |

3. Adjusting the CCD

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|-----------------------------|-------------------|--------------------------|---|--|
| 1 | V _{sub} adjustment | Digital voltmeter | TP - 2 [IMEGER board] | R14 (V _{sub}) [IMEGER board] | <div>1. Connect a digital voltmeter to TP - 2.</div> <div>2. Set an imager-specified voltage V_{sub} with R14 (V_{sub}).</div> <div>■ The specified voltage is indicated on the back of CCD. See the box below : How to compute the specified voltages.</div> |
| 2 | RESET GATE adjustment | Oscilloscope | TP - 3 [IMEGER board] | R2 (RG) [IMEGER board] | <div>1. Connect an oscilloscope to TP - 3.</div> <div>2. Set the reset gate pulse low level to an image-specified voltage VRGL with R2 (RG).</div> <div>■ The specified voltage is indicated on the back of CCD. SEE the box below : How to compute the specified voltages.</div> <div></div> |

How to compute thespecified voltages



This indicates VRGL. This indicates VSUB.

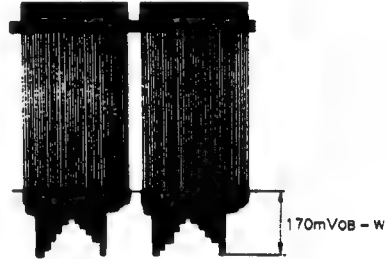
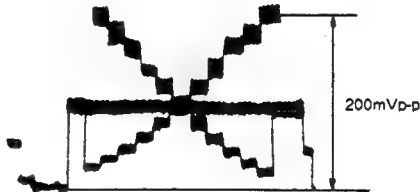
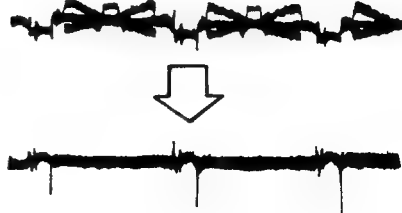
The mnemonics correspond to the actual values as follows :

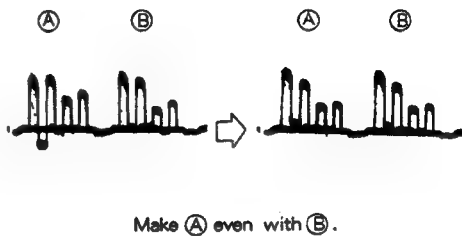
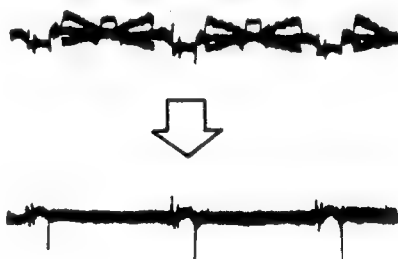

| | | | | | | | |
|---------------|-----|-----|-----|-----|-----|-----|-----|
| VRGL mnemonic | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Actual value | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |


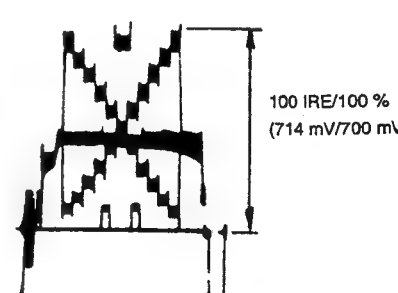
| | | | | | | | | | | | | | | | | | | | | |
|---------------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| VSUB mnemonic | E | f | G | h | J | K | L | m | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| Actual value | 9.0 | 9.5 | 10.0 | 10.5 | 11.0 | 11.5 | 12.0 | 12.5 | 13.0 | 13.5 | 14.0 | 14.5 | 15.0 | 15.5 | 16.0 | 16.5 | 17.0 | 17.5 | 18.0 | 18.5 |

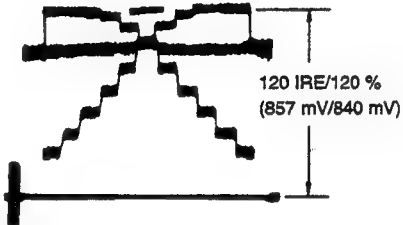
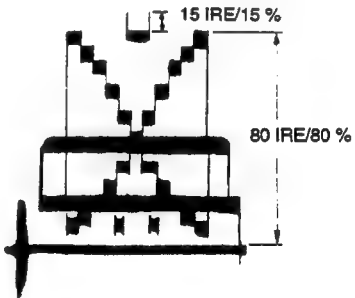
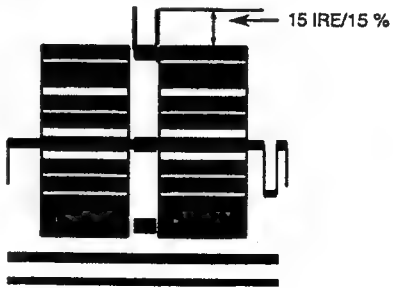
Example : "5L" means VRGL = 3.0V and VSUB = 12.0V

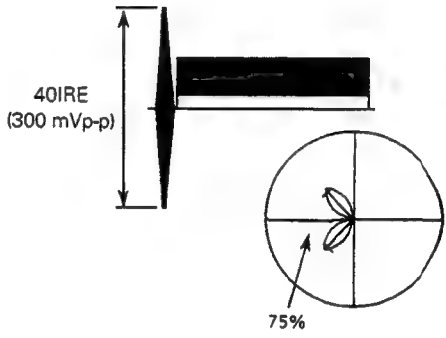
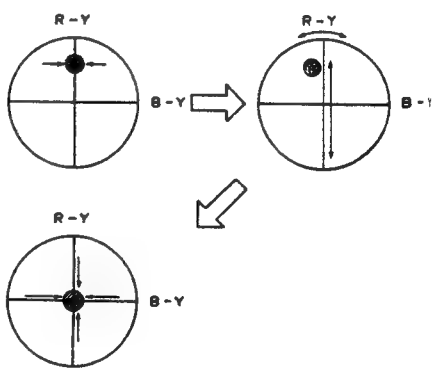
4. Adjusting the signal system

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|--------------------------------|-----------------------------|--|--|---|
| 1 | MAX GAIN VOLTAGE adjustment | Digital voltmeter | TP - 1 (MAX GAIN) [CDS/TG board] | R5 (MAX GAIN) [CDS/TG board] | <ol style="list-style-type: none"> 1. Connect a digital voltmeter to TP - 1 (MAX GAIN). 2. Set the voltage to 4.5V with R5 (MAX GAIN). |
| 2 | IN DOOR W/B VOLTAGE adjustment | Digital voltmeter | TP-101 (R CTL) TP-102 (B CTL) [FEATURE board] | R141 (R CTL) R142 (B CTL) [FEATURE board] | <ol style="list-style-type: none"> 1. Connect a digital voltmeter to TP - 101 (R CTL). 2. Set the TP - 101 voltage to 4.00V with R141 (R CTL). 3. Connect the digital voltmeter to TP - 102 (B CTL). 4. Set the TP - 102 voltage to 4.20V with R142 (B CTL). |
| 3 | CCD OUT adjustment | Oscilloscope, Gray scale | TP - 1 (CCD OUT) [IMEGER board] | Lens iris | <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 1 (CCD OUT). 2. Set the CCD OUT to 170mVp-p (TK-1280), 200 mVp-p (TK1180) with the lens iris VR.  |
| 4 | 0dB GAIN adjustment | Oscilloscope, Gray scale | TP - 3 (Y out) [CDS/TG board] | R8 (0dB GAIN) [CDS/TG board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 3 (Y OUT). 2. Adjust the voltage to 200mV with R8 (0dB GAIN).  |
| 5 | DL YH GAIN adjustment | Oscilloscope, Gray scale | TP - 1 (Y1 - Y0) [MAT/ENC board] | R46 (DL YH GAIN) [MAT/ENC board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 1 (Y1 - Y0). 2. Use R46 (DL YH GAIN) to adjust the waveform so that it may become flat.  |

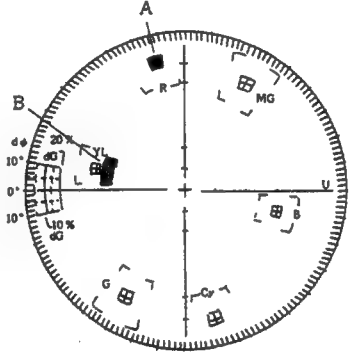
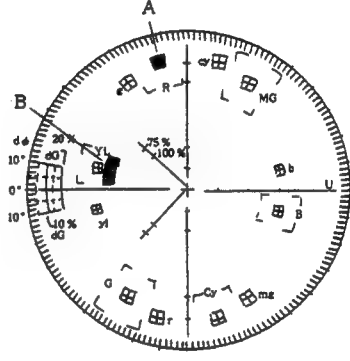
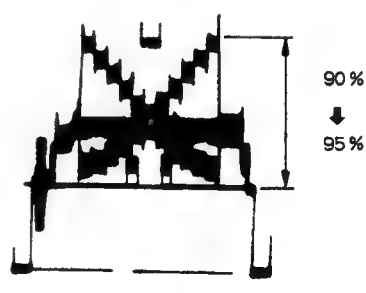
| No. | Item | Instrument | Test point | Control | Procedure |
|-----|---------------------------|-----------------------------|---|---|---|
| 6 | C1 GAIN adjustment | Oscilloscope, Color bars | TP - 3 (B) [MAT/ENC board] | R8 (C1 GAIN) [MAT/ENC board] | <p>● CCD OUT: 340mV (TK-1280), 400mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 3 (B). 2. Match the YL level for each 1H with R8 (C1 GAIN).  <p>Make A even with B.</p> |
| 7 | R GAIN, B GAIN adjustment | Oscilloscope, Gray scale | TP - 6 (R-YO) TP - 8 (B-YO) [MAT/ENC board] | R21 (R GAIN) R23 (B GAIN) [MAT/ENC board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 6 (R-YO). 2. Use R GAIN VR (R21) to adjust the TP - 6 waveform so that it may become flat. 3. Connect the oscilloscope to TP - 8 (B-YO). 4. Use B GAIN VR (R23) to adjust the TP - 8 waveform so that it may become flat.  |
| 8 | Y1, Y2 GAIN adjustment | Oscilloscope, Gray scale | TP - 2 (VAP) [MAT/ENC board] | R3 (Y1, Y2 GAIN) [MAT/ENC board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 2 (VAP). 2. Match the overshoot and pre-shoot level with R3 (Y1, Y2 GAIN).  |

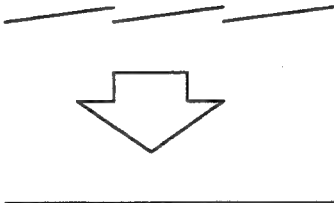
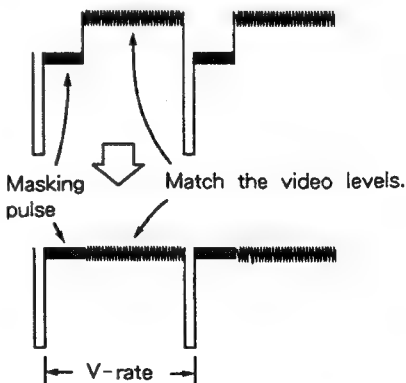
| No. | Item | Instrument | Test point | Control | Procedure |
|-----|------------------------|---|---|--------------------------------------|--|
| 9 | R - Y1 GAIN adjustment | Oscilloscope, Color bars | TP - 6 (R - Y0) TP - 7 (R - Y1) [MAT/ENC board] | R77 (R - Y1 GAIN) [MAT/ENC board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect the oscilloscope 1CH to TP - 6 (R - Y0). 2. Connect the oscilloscope 2CH to TP - 7 (R - Y1). 3. Invert the 2CH waveform and add to 1CH. 4. Use R77 (R - Y1 GAIN) to adjust the waveform so that it may become flat. |
| 10 | B - Y1 GAIN adjustment | Oscilloscope, Color bars | TP - 8 (B - Y0) TP - 9 (B - Y1) [MAT/ENC board] | R85 (B - Y1 GAIN) [MAT/ENC board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect the oscilloscope 1CH to TP - 8 (B - Y0). 2. Connect the oscilloscope 2CH to TP - 9 (B - Y1). 3. Invert the 2CH waveform and add to 1CH. 4. Use R85 (B - Y1 GAIN) to adjust the waveform so that it may become flat. |
| 11 | Y SET UP adjustment | Oscilloscope | VIDEO OUT | R114 (Y SET UP) [MAT/ENC board] | <p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Adjust Y SET UP to 53.5 mV (NTSC) / 52.5 mV (PAL) with R114 (Y SET UP). (Waveform monitor : 7.5 IRE/7.5 %)  |
| 12 | Y GAIN adjustment | Waveform monitor or Oscilloscope, Gray scale | VIDEO OUT | R111 (Y GAIN) [MAT/ENC board] | <p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Reset the Y KNEE. 3. Adjust the video output to 714 mV (NTSC) / 700 mV (PAL) with R111 (Y GAIN). (Waveform monitor : 100 IRE/100 %) 4. Y KNEE adjustment.  |

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|----------------------|---|------------|----------------------------------|--|
| 13 | Y KNEE adjustment | Waveform monitor or Oscilloscope | VIDEO OUT | R181 (Y KNEE) [MAT/ENC board] | <p>● IRIS : OPEN</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Adjust the white peak to 857 mV (NTSC) / 840 mV (PAL) with R181 (Y KNEE). (Waveform monitor : 120 IRE/120 %)  |
| 14 | AP LEVEL adjustment | Waveform monitor or Oscilloscope, Gray scale | VIDEO OUT | R107 (APL) [MAT/ENC board] | <p>● VIDEO OUT : 80 IRE/80 %</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Make sure the focus is correct. 3. Adjust the overshoot of the white peak at the gray scale center to 10mV with R107 (APL). (Waveform monitor : 15 IRE/15 %)  |
| 15 | V CONTOUR adjustment | Waveform monitor or Oscilloscope, Gray scale | VIDEO OUT | R43 (VAP) [MAT/ENC board] | <p>● VIDEO OUT : 80 IRE/80 %</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Make sure the focus is correct. 3. Adjust the overshoot of the white peak at the gray scale center to 10mV with R43 (VAP). (Waveform monitor : 15 IRE/15 %)  |

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|----------------------------|---|------------|---|---|
| 16 | BURST LEVEL adjustment | Waveform monitor, Vectorscope, or Oscilloscope | VIDEO OUT | R102 (BURST LEVEL) [MAT/ENC board] | <p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor, vectorscope, or oscilloscope to the video output. 2. Adjust the burst to 286 mV (NTSC) / 300 mV (PAL) with R102 (BURST LEVEL). (Vectorscope : 75 %)  |
| 17 | CARRIER BALANCE adjustment | Vectorscope | VIDEO OUT | R92 (R-Y) R93 (B-Y) [MAT/ENC board] | <p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect a vectorscope to the video output. 2. Use R92 (R-Y) and R93 (B-Y) to adjust the carrier balance so that it may come to the vectorscope center.  |

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|--|---|------------|--|--|
| 18 | AUTO W/B adjustment | Vectorscope, Gray scale, C10 + C8 filter, W4 + W2 filter, CC - 12G filter | VIDEO OUT | R203 (A WB R) R202 (A WB B) [FEATURE board] | <p>● VIDEO OUT : 100 %</p> <ol style="list-style-type: none"> 1. Use R203 (A WB R) and R202 (A WB B) to adjust a rosette of the vectorscope so that it may come to the center. 2. Set the white balance SW to AUTO. 3. Use R203 (A WB R) and R202 (A WB B) to adjust a rosette of the vectorscope so that it may come to the center. 4. Apply each of the C10 + C8, W4 + W2, CC - 12G filters and check a white balance is established. (If not, adjust the white balance with R21 (R GAIN) and R23 (B GAIN). 5. Reset the white balance SW to IN DOOR. |
| 19 | IN DOOR W/B adjustment | Vectorscope, Gray scale | VIDEO OUT | R21 (R GAIN) R23 (B GAIN) [MAT/ENC board] | <p>● VIDEO OUT : 100 %</p> <ol style="list-style-type: none"> 1. Connect a vectorscope to the video output. 2. Use R141 (RCTL) and R142 (BCTL) to adjust a rosette of the vectorscope so that it may come to the center. |
| 20 | MANU, white balance circuit adjustment | Oscilloscope, Gray scale, C12 filter | VIDEO OUT | R136 (G - Mg) R122 (R - B) R127 (R OFFSET) R130 (R GAIN) [FEATURE board] | <p>● VIDEO OUT : 100 %</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor, vectorscope to the video output. 2. Set the white balance SW to MANUAL. 3. Set R136 (G - Mg) to the center. 4. Shoot the gray scale under the 3200°K light source. 5. Adjust the white balance with R122 (R - B) and R127 (R OFFSET). 6. Fit a C12 filter and shoot the gray scale. 7. Adjust the white balance with R122 (R - B) and R130 (R GAIN) 8. Repeat steps 4 to 7 once or twice more. 9. Reset the white balance SW to IN DOOR. |


| No. | Item | Instrument | Test point | Control | Procedure |
|---|---------------------------------|---|------------|---|--|
| 21 | Colour repeatability adjustment | Vectorscope, Colour bars | Video out | R55 (R - Y HUE) R54 (B - Y HUE) R51 (R - Y GAIN) R53 (B - Y GAIN) [MAT/ENC board] | <p>● VIDEO OUT :100 IRE/100%</p> <ol style="list-style-type: none"> 1. Connect a vectorscope to the video output. 2. Adjust the R axis to a required position A with R55 (R - Y HUE). 3. Adjust the YL axis to a required position B with R54 (B - Y HUE). 4. Adjust the R saturation to a specified position with R51 (R - Y GAIN). 5. Adjust the YL saturation to a specified position with R53 (B - Y GAIN). |
| <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <p>NTSC</p> <p>PAL</p> </div> | | | | | |
| 22 | AGC SET adjustment | Waveform monitor or Oscilloscope, Gray scale | VIDEO OUT | R14 (AGC SET) [CDS/TG board] | <p>● VIDEO OUT : 90 IRE/90%</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Turn the AGC SW to ON and adjust the output to 95 IRE/95 % with R14 (AGC SET). |
|  | | | | | |

| No. | Item | Instrument | Test point | Control | Procedure |
|-----|---|--|-------------------------------------|--|--|
| 23 | CCD - IRIS offset adjustment | Oscilloscope, | TP - 301 (CCD IRIS) [FEATURE board] | R310 (CCD IRIS) [FEATURE board] | <p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 301 (CCD IRIS). (5ms/div, 0.2V/div DC) 2. Use R310 (CCD IRIS) to adjust the TP - 301 (CCD IRIS) so that it may become flat.  |
| 24 | IRIS LEVEL SUB - VR adjustment | Waveform monitor or Oscilloscope, Gray scale | VIDEO OUT | R22 (IRIS LEVEL) [CDS/TG board] | <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Shoot the gray scale cross point at 70 to 100 IRE/100 %. 3. Set the SHUTTER mode SW to "CCD - IRIS" position. 4. Adjust the gray scale to 100 IRE/100 % with R22 (IRIS LEVEL). (NTSC : 714mV, PAL : 700mV) |
| 25 | GALVANO-METRIC AE LENS DRIVE CIRCUIT adjustment | Oscilloscope, White pattern, Galvanometric AE lens | VIDEO OUT or TP - 4 [CDS/TG board] | R116 (ALC) R113 (GAIN) [FEATURE board] | <ol style="list-style-type: none"> 1. Fit a galvanometric AE lens. 2. Turn ON the BLC switch. 3. Connect a waveform monitor or oscilloscope to the video output. 4. Connect the oscilloscope to the auto iris terminal output. (V - rate 200 mV/div.) 5. Set R116 (ALC) to the center. 6. Make the auto iris terminal output level flat with R113 (GAIN). (Match the video level with the masking pulse level.)  |

STANDARD CIRCUIT DIAGRAMS AND BOARDS

■ NOTE ON USING CIRCUIT DIAGRAMS


1. SAFETY

The components identified by the  symbol and shading are critical for safety. For continued safety replace safety critical components only with manufactures recommended parts.

2. SPECIFIED VOLTAGE AND WAVEFORM VALUES

The voltage and waveform values have been measured under the following conditions.

(1) Camera head

- Illumination : Illumination condition during standard adjustment
- Object : JVC Gray scale pattern ($\gamma = 2.2$, 11 steps)
- Iris : Set the VIDEO OUT wave form level to 714 mV_{PD-WP} (AGC OFF) with IRIS switch (at the lens side)
- Switch : AGC = OFF
SHUTTER = NORM
WHITE BALANCE =  (AUTO)

(2) Voltage values : All DC voltage values

(3) Waveform : Usually a probe of 10:1 is used

3. INDICATION OF PARTS SYMBOL [EXAMPLE]

- In the PW board: CAS-1502A
R1001 → R1 or R01
C1023 → C23
- Module PW board: CAS-A502A
ICA001 → IC1
QA023 → Q23

4. COLOR OF P.C. BOARD PATTEN

-  : Top side
 : Bottom side

5. INDICATIONS ON THE CIRCUIT DIAGRAM

(1) Resistors

- Resistance value
 - No unit : $[\Omega]$
 - K : $[K\Omega]$
 - M : $[M\Omega]$
- Rated allowable power
 - No indication : 1/10 [W]
 - Others : As specified
- Type
 - No indication : Carbon resistor or Chip resistor
 - OMR : Oxide metal film resistor
 - FR : Fusible resistor


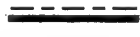







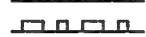

(2) Capacitors

- Capacitance value
 - 1 or higher : $[pF]$
 - less than 1 : $[\mu F]$
- Withstand voltage
 - No indication : DC50 [V]
 - Others : DC withstand voltage [V]
 - AC indicated : AC withstand voltage [V]
- Electrolytic Capacitors
 - 47/50 [Example]: Capacitance value $[\mu F]$ / withstand voltage [V]
- Type
 - No indication : Ceramic capacitor
 - MY : Mylar capacitor
 - PP : Polypropylene capacitor
 - TF : Thin film capacitor
 - BP : Bipolar electrolytic capacitor
 - TAN : Tantalum capacitor

(3) Coils

- No unit : $[\mu H]$
- Others : As specified

(4) Power Supply

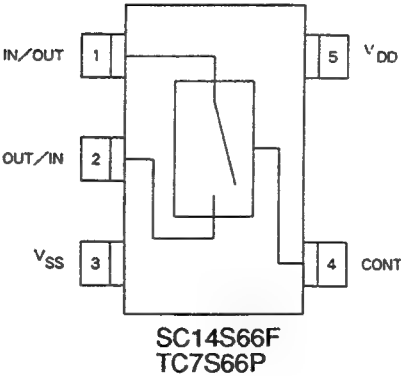
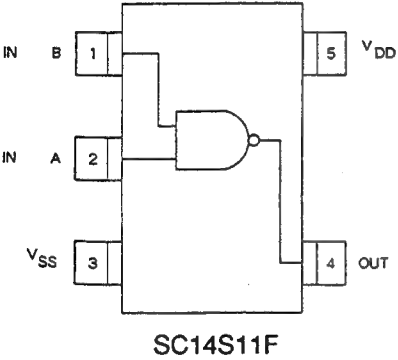
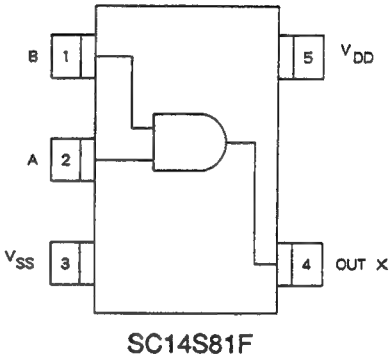
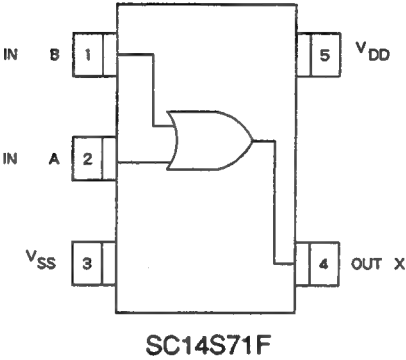
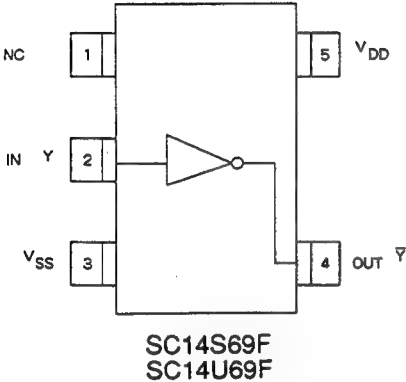
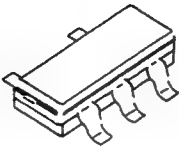
- | | | | |
|---|---------|---|-------|
|  | : +15V |  | -10V |
|  | : +12V |  | -25V |
|  | : +9.5V |  | AC24V |
|  | : +8.5V |  | +17V |
|  | : +7V | | |
|  | : +5V | | |
|  | : -9V | | |

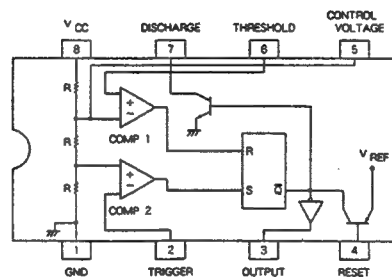
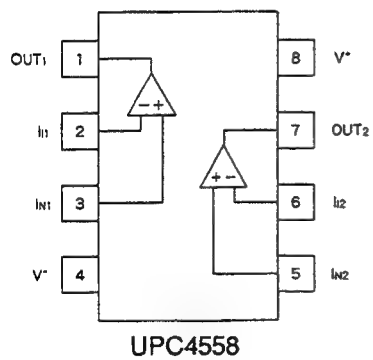
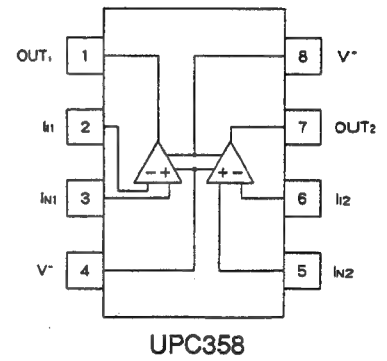
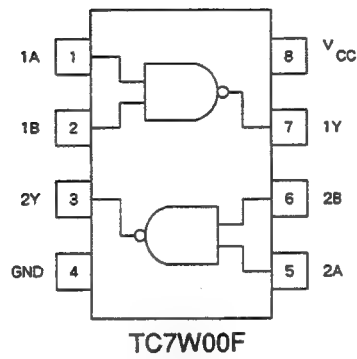
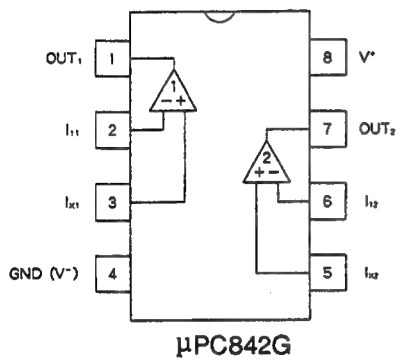
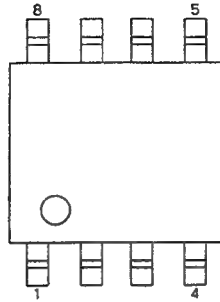
(5) Test Point

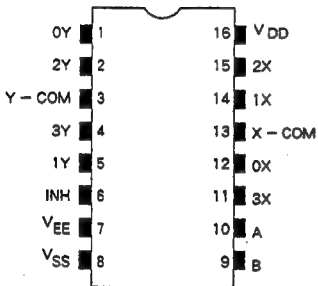
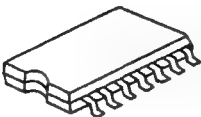


◇ Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.

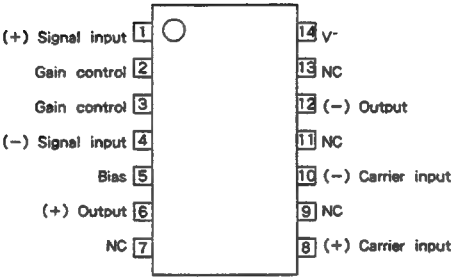
PIN ARRANGMENTS OF ICs AND TRANSISTORS



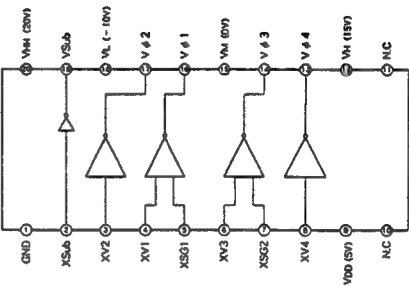




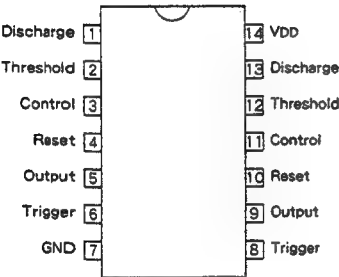
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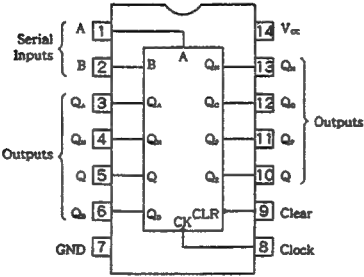
NJM1496M



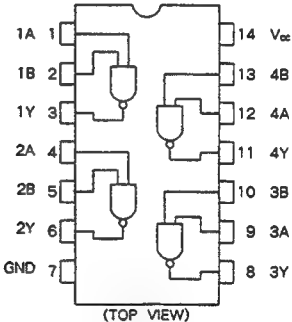
CXD1250M



MP-D55566

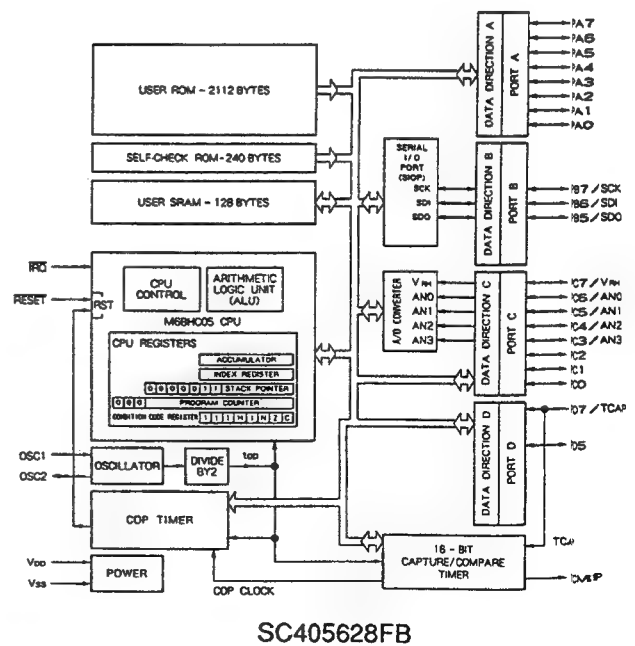
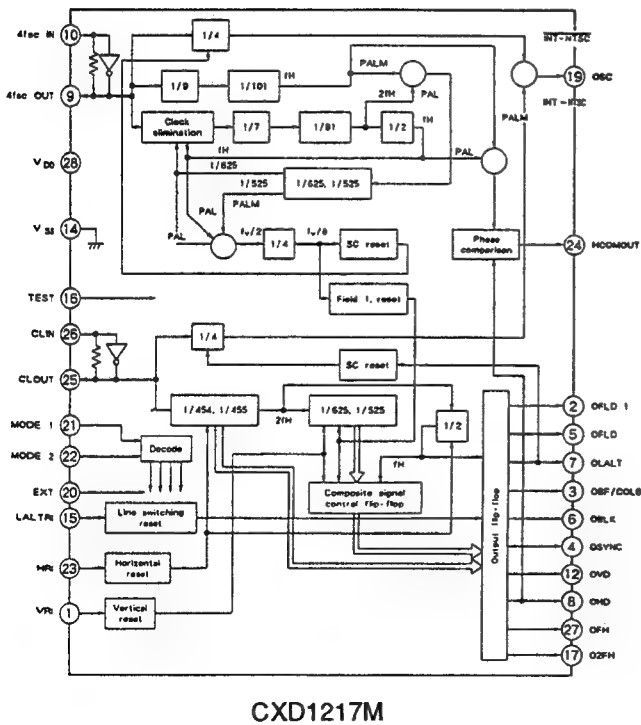
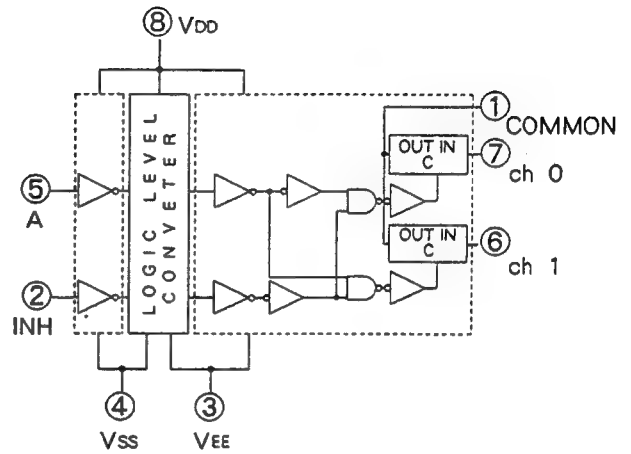
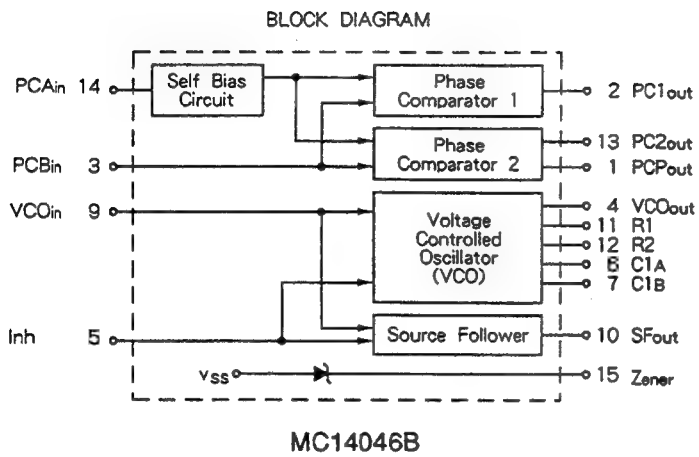


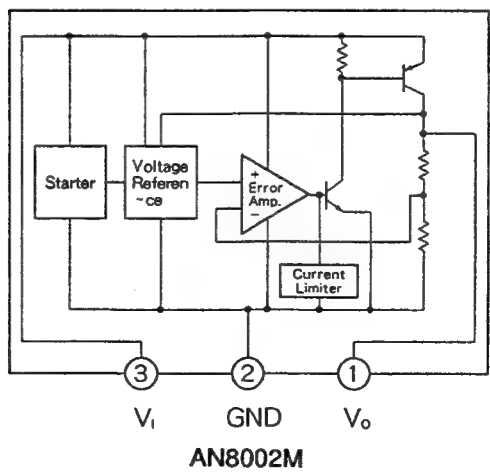
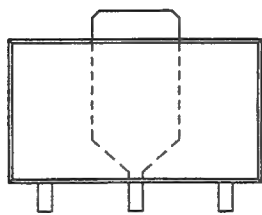
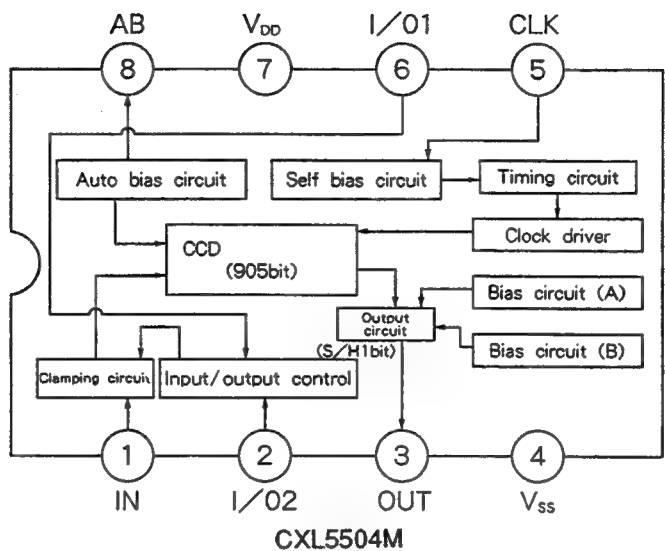
HD74HC164

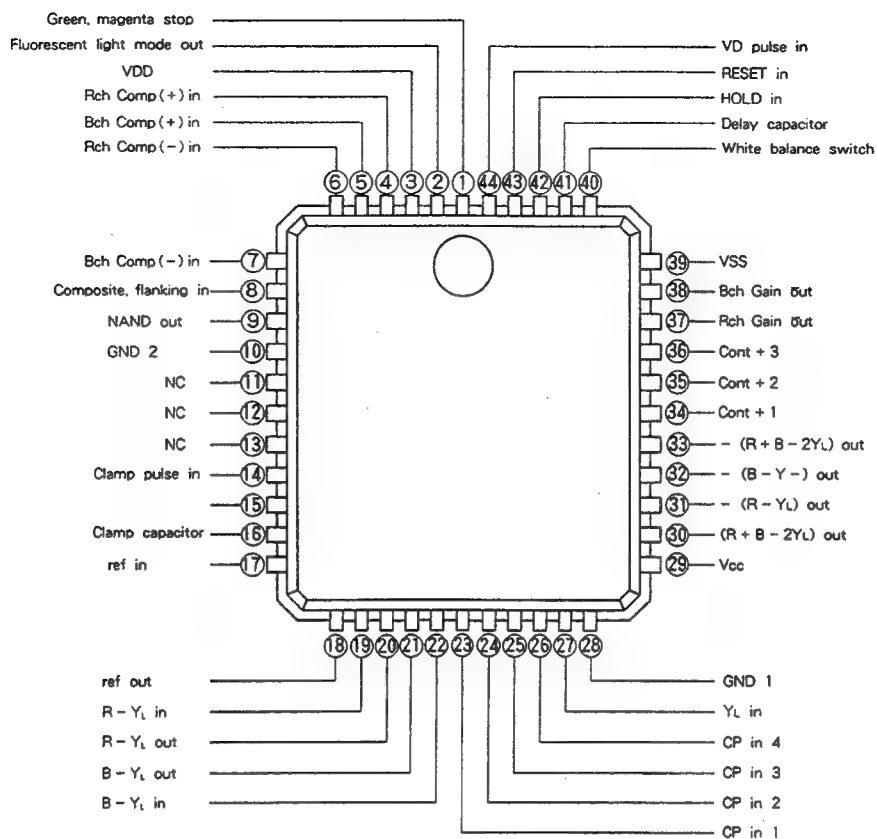


(TOP VIEW)

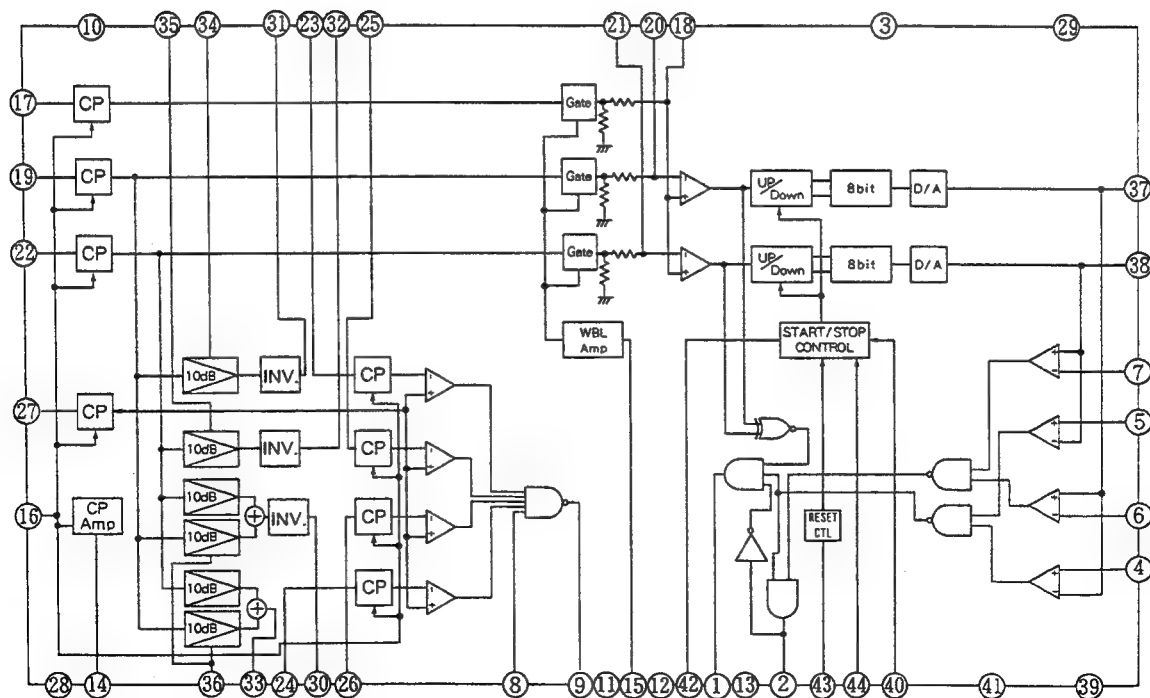
TC74HC00AF





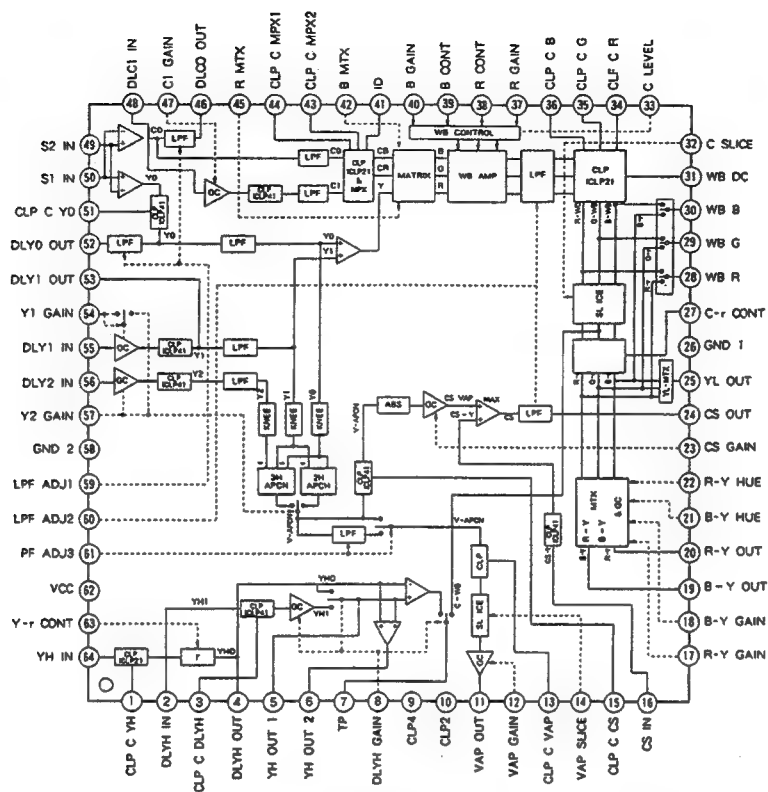


HA118118MA

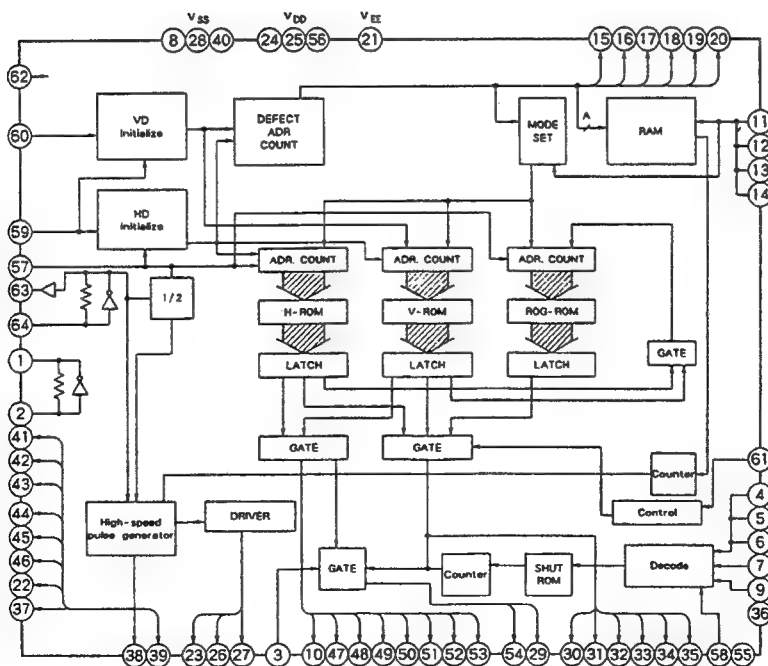


HA118118MA

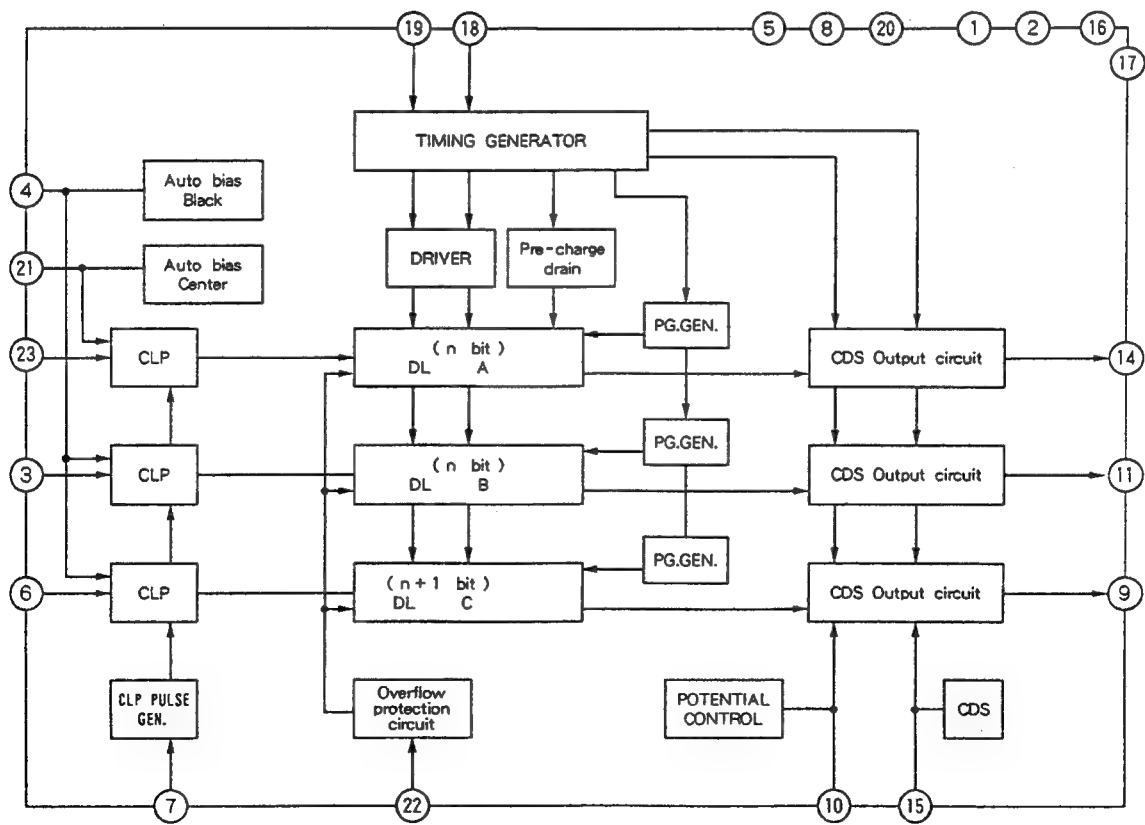
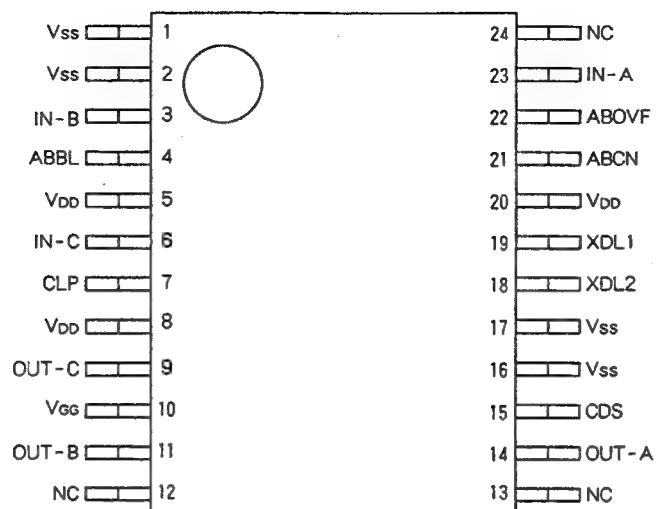




CXA1391R

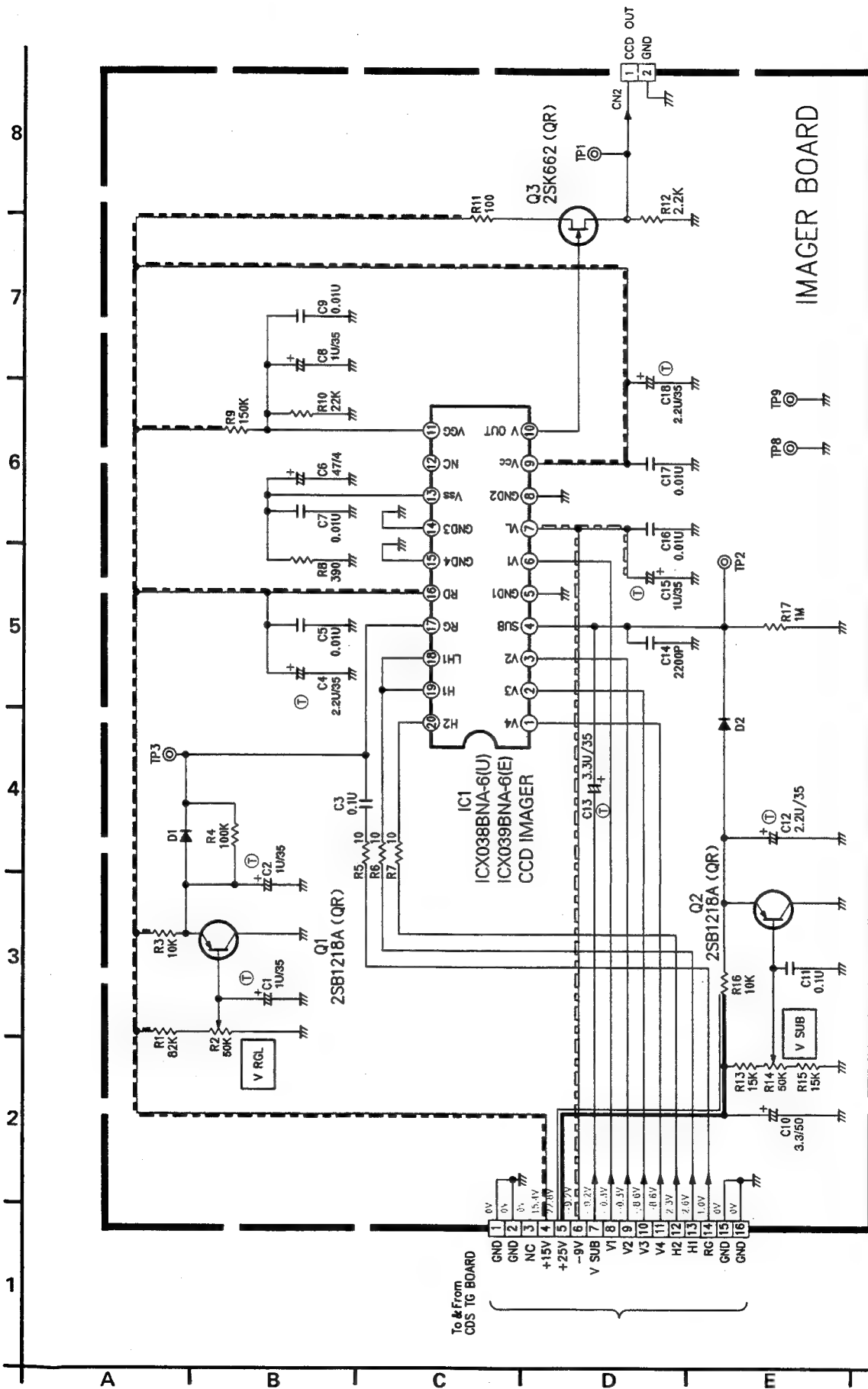


CXD1252AR/AQ

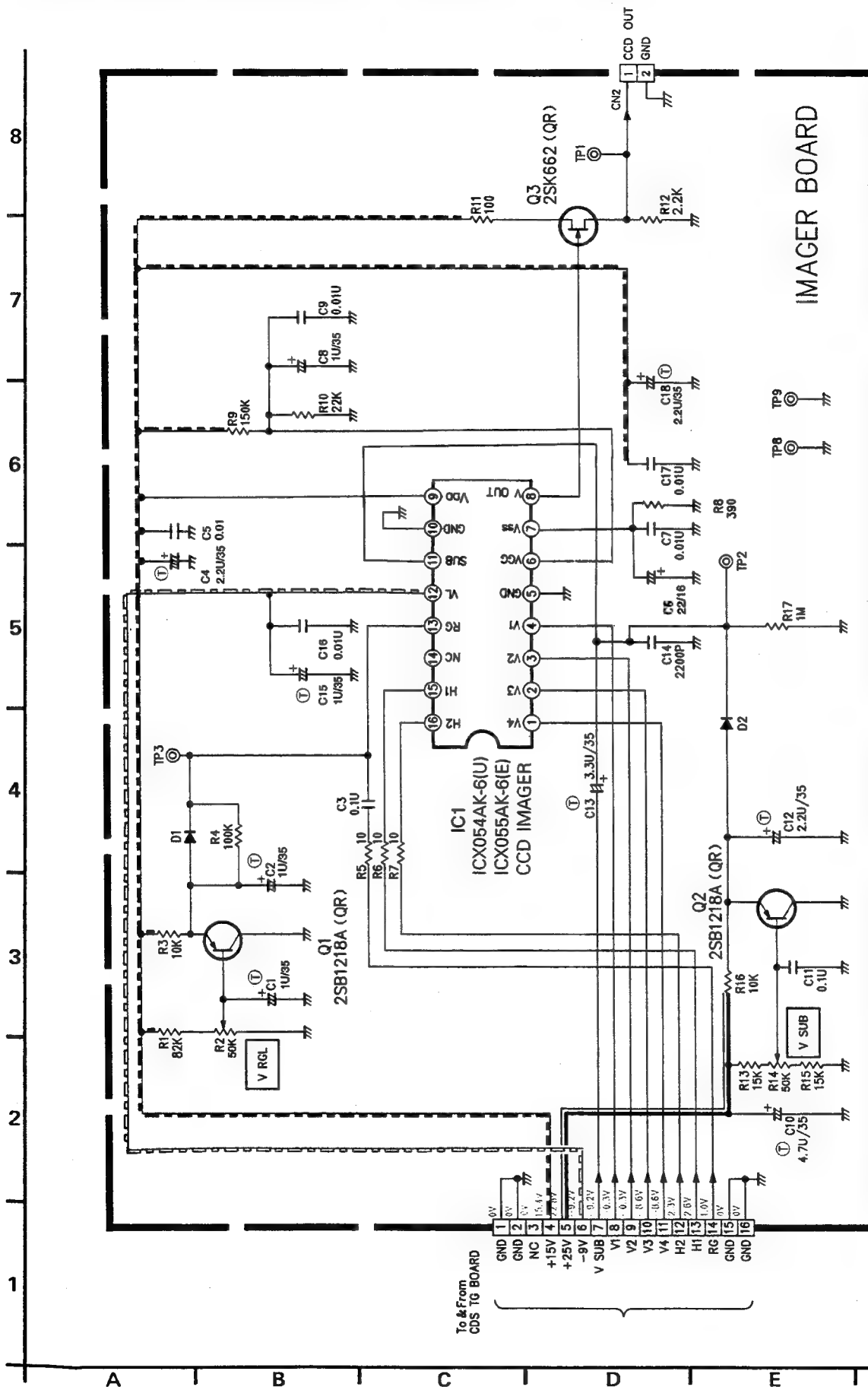


CX1517N

IMAGER BOARD CIRCUIT DIAGRAM (TK-1280/1281)

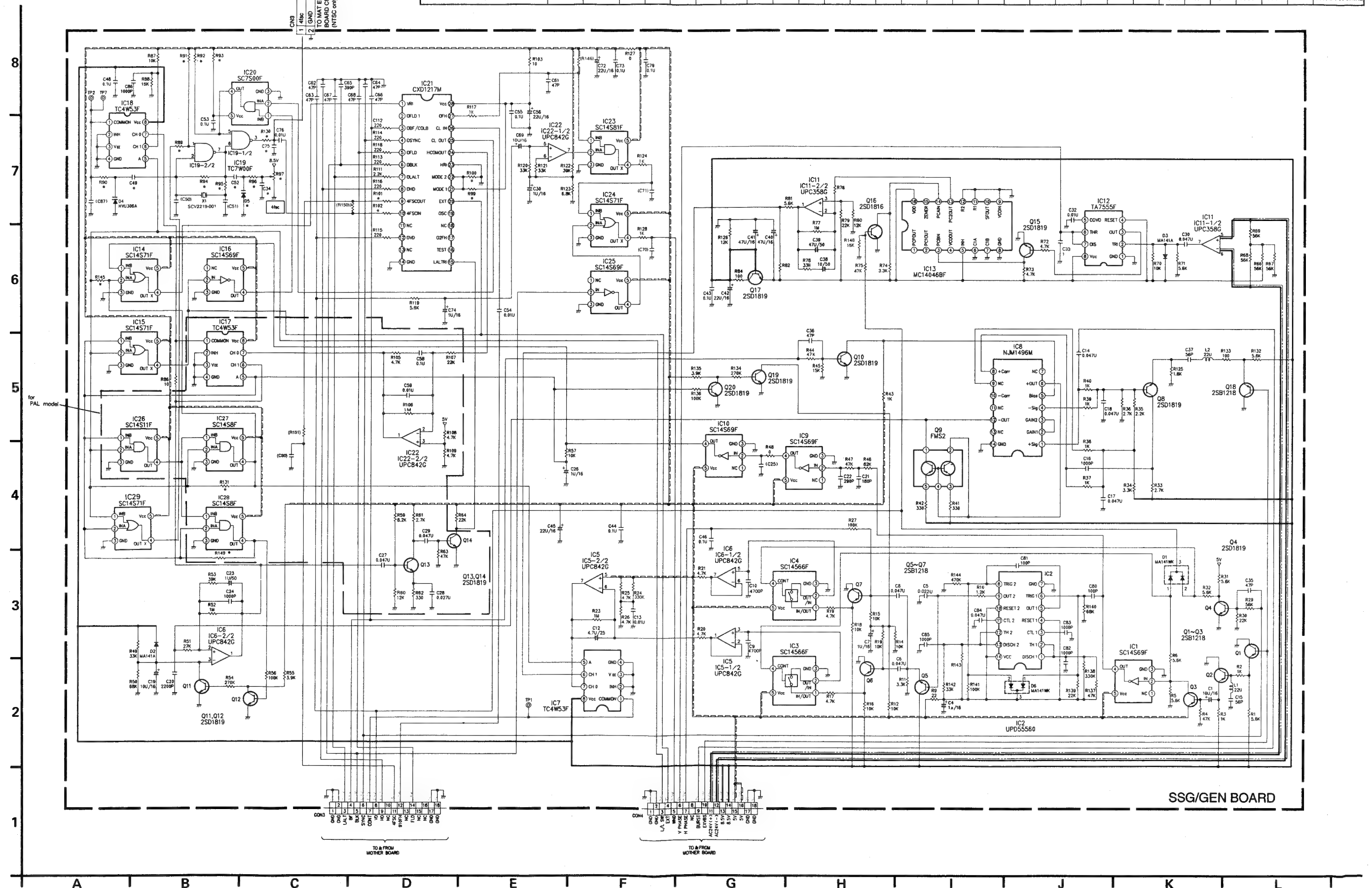


IMAGER BOARD CIRCUIT DIAGRAM (TK-1180)



SSG/GENLOCK BOARD CIRCUIT DIAGRAM

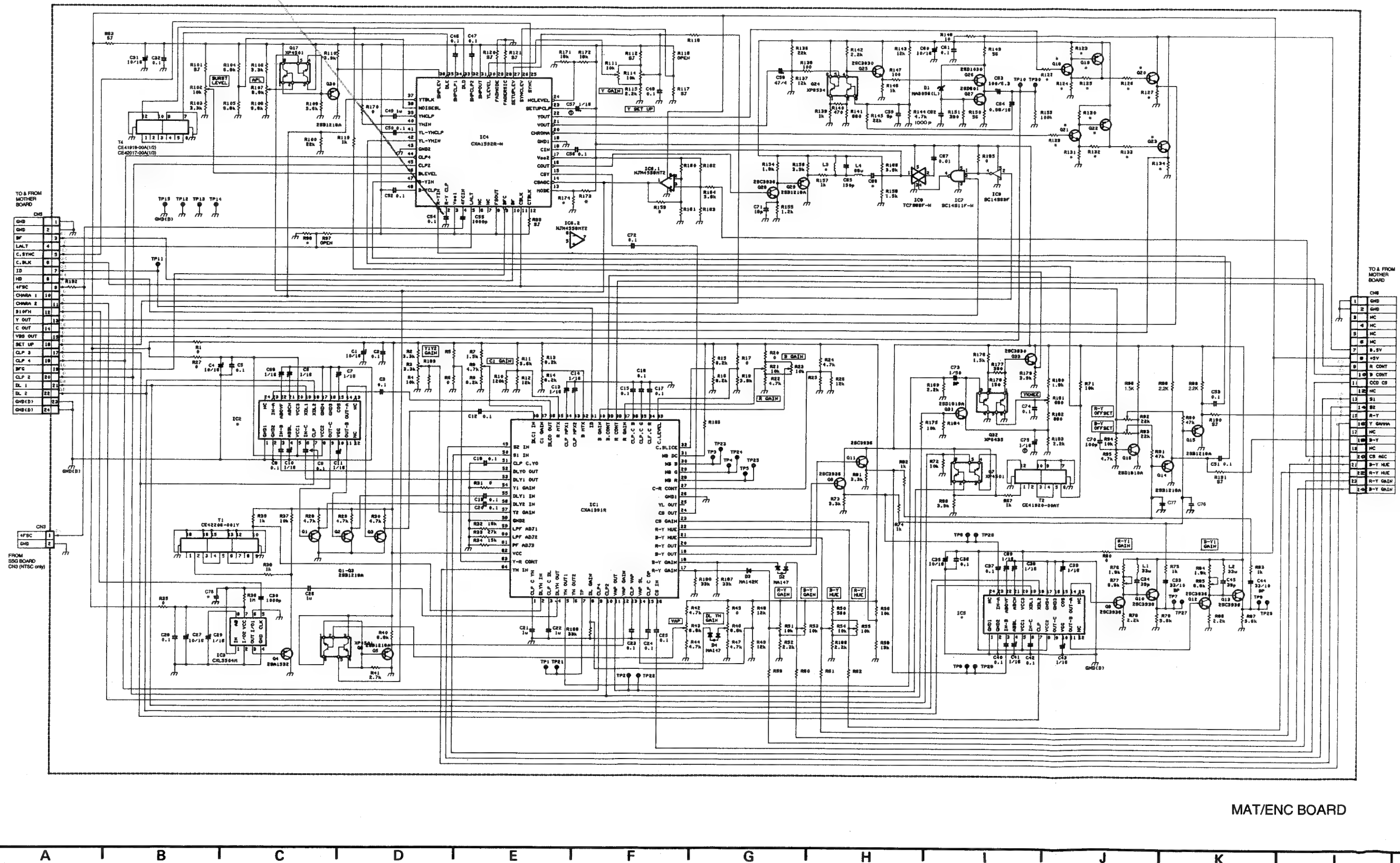
| | IC29 | D5 | R87 | R88 | R89 | R90 | R91 | R92 | R93 | R94 | R95 | R96 | R97 | R99 | R100 | R101 | R102 | R130 | R131 | R145 | R149 | C9 | C10 | C26 | C34 | C49 | C52 | C75 | C86 | X1 |
|-----------------------------|----------|---------|-----|-----|-------|------|-------|-------|-----|-----|-----|------|-----|-------|-------|-------|-------|------|-------|------|-------|-------|-------|-------|------|-----|-------|------|-------|--------------|
| TK-1280JAPAN/U/TK-1180U | SC14S71F | HVU306A | 10K | 10K | SHORT | 100K | — | — | 150 | 1M | 100 | 100K | 10K | — | SHORT | — | — | 1K | SHORT | — | SHORT | 4700P | 4700P | SHORT | 0.01 | 33P | 1000P | 220K | 1000P | 14.31818MHz |
| TK-1280E/TK-1180E/TK-1281EG | — | HVU306A | 10K | 10K | — | 100K | SHORT | SHORT | 56 | 1M | 220 | 100K | 10K | SHORT | — | SHORT | SHORT | 150 | — | — | — | 0.01 | 0.01 | 1/16 | 0.01 | 27P | 1000P | 100P | 1000P | 17.734475MHz |



MAT/ENC BOARD CIRCUIT DIAGRAM

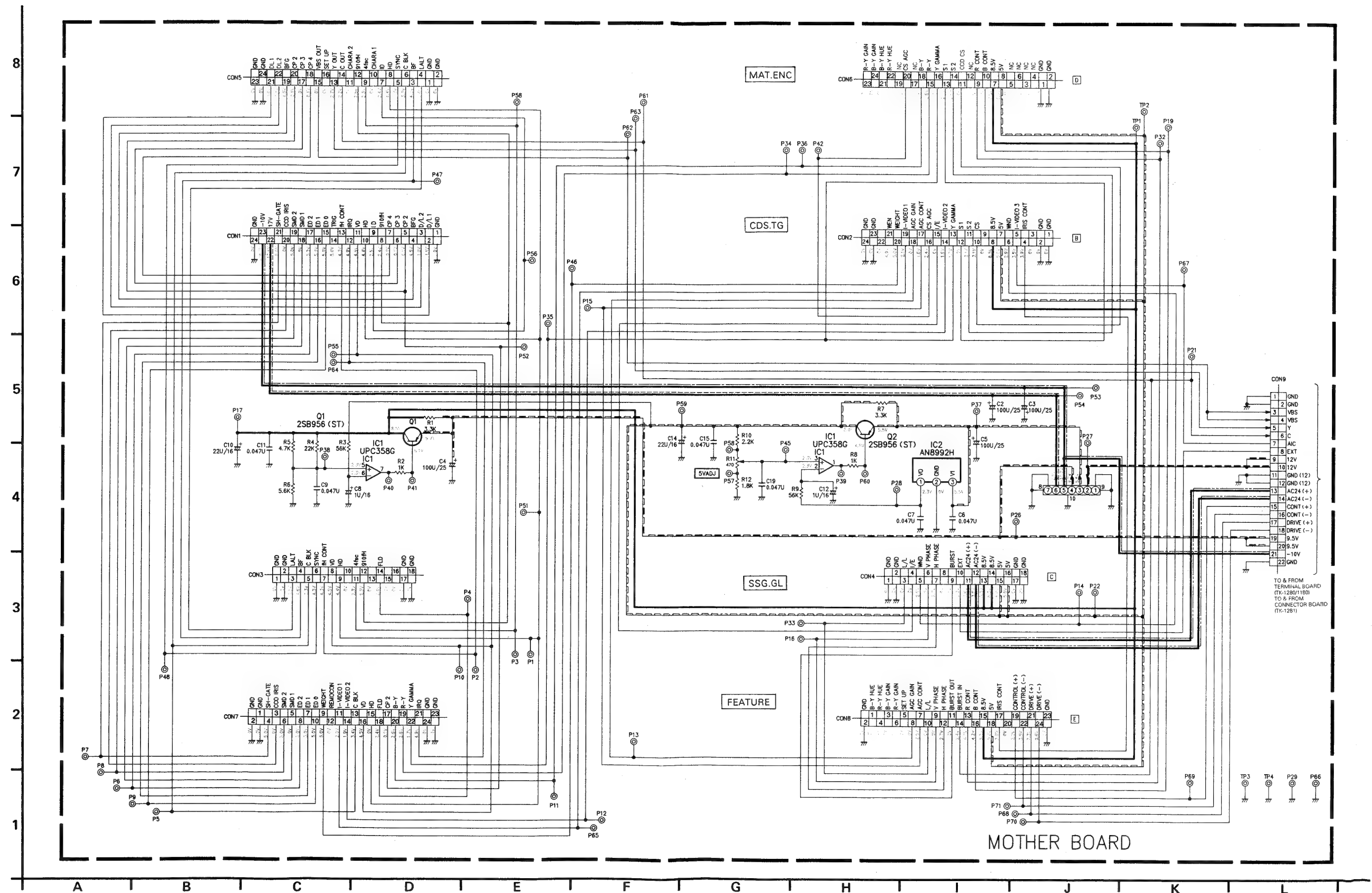
C54 ROT LAUFFWEG
TERMO

| | IC2 | IC5 | L3 | C66 | R98 | R173 | R174 | Q18 | Q19 | Q20,23 | Q21 | Q22 | R122 | R123 | R124 | R125 | R126 | R127 | R129 | R130 | R131 | R132 | R133 | R134 | CN3 | C78 | C76 | C77 |
|--------------------|----------|----------|-----------|-----|-------|-------|-------|--------------|--------------|-------------|-------------|--------------|------|------|------|------|------|------|------|------|------|------|------|------|----------|-----|------|------|
| TK-1280JAPAN/U | CXL1517N | CXL1517N | 15 μ | 33P | SHORT | — | SHORT | 2SC3930(ABC) | 2SA1532(ABC) | 2SD1030(RS) | 2SC3936(BC) | 2SB1218A(QR) | 100 | 2.7K | 1.2K | 1.2K | 100 | 5.6K | 100 | 2.7K | 1.2K | 1.2K | 100 | 3.9K | USED | — | — | — |
| TK-1280E/TK-1281EG | CXL1517N | CXL1517N | 8.2 μ | 18P | — | SHORT | — | 2SC3930(ABC) | 2SA1532(ABC) | 2SD1030(RS) | 2SC3936(BC) | 2SB1218A(QR) | 100 | 2.7K | 1.2K | 1.2K | 100 | 5.6K | 100 | 2.7K | 1.2K | 1.2K | 100 | 3.9K | NOT USED | — | — | — |
| TK-1180U | CXL1518N | CXL1518N | 15 μ | 33P | SHORT | — | SHORT | — | — | 2SD1030(RS) | 2SC3936(BC) | 2SB1218A(QR) | — | — | — | — | — | — | 100 | 2.7K | 1.2K | 1.2K | 100 | 3.9K | USED | — | — | — |
| TK-1180E | CXL1518N | CXL1518N | 8.2 μ | 18P | — | SHORT | — | — | — | 2SD1030(RS) | 2SC3936(BC) | 2SB1218A(QR) | — | — | — | — | — | — | 100 | 2.7K | 1.2K | 1.2K | 100 | 3.9K | USED | 39P | 220P | 220P |





MOTHER BOARD CIRCUIT DIAGRAM



The schematic diagram is divided into two main sections: the VIDEO BOARD and the POWER BOARD.

VIDEO BOARD: This section includes a terminal board with 15 pins. The connections are as follows:

- Pin 1: GND
- Pin 2: VIDEO OUT
- Pin 3: GND
- Pin 4: Y OUT
- Pin 5: GND
- Pin 6: C OUT
- Pin 7: GND
- Pin 8: AIC
- Pin 9: EXT
- Pin 10: CONTROL(+)
- Pin 11: CONTROL(-)
- Pin 12: DRIVE(+)
- Pin 13: DRIVE(-)
- Pin 14: 5.5V
- Pin 15: -10V

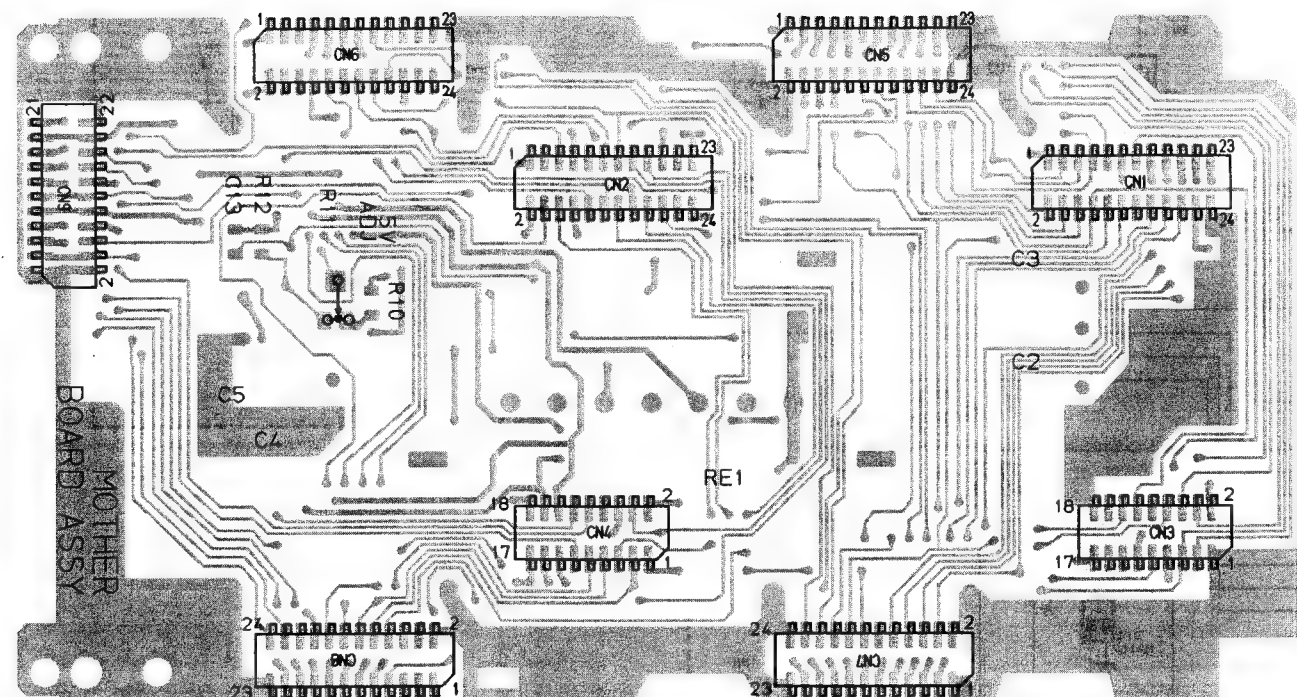
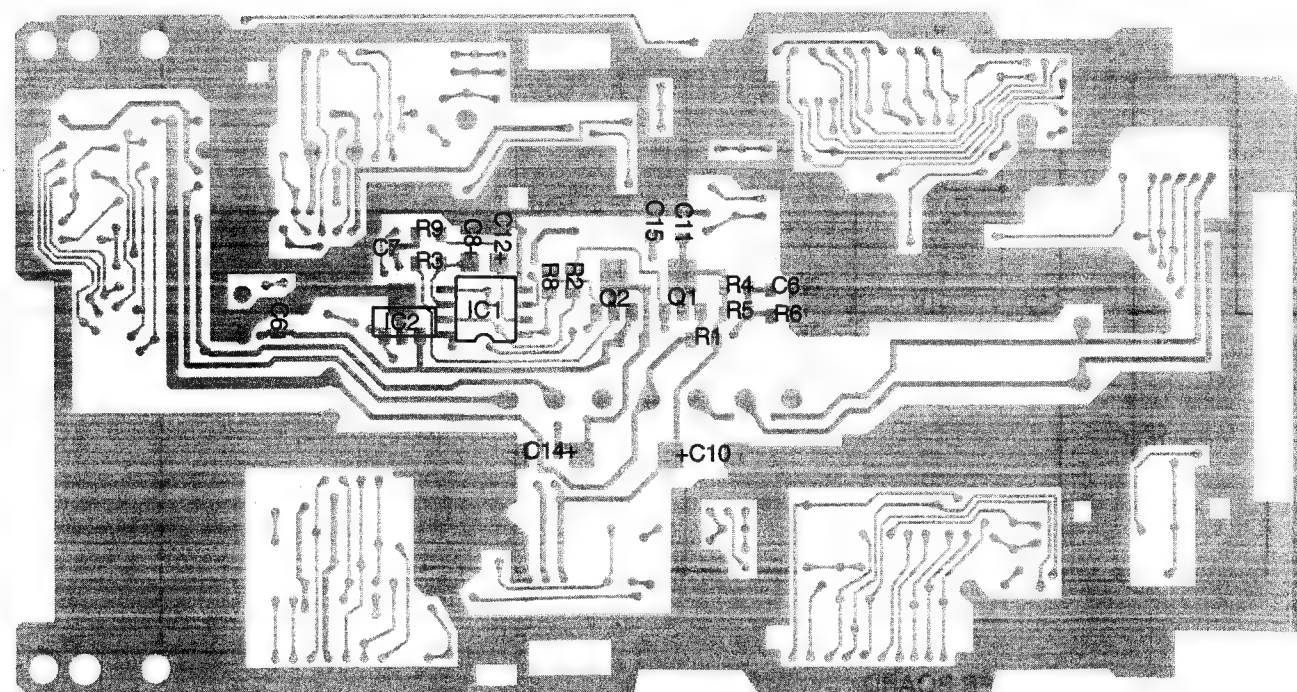
 The circuit features two video amplifiers, JK1 (QMD8A04-001) and JK4 (QMD8A03-001), both 25C2778 (BC). It includes various resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100), capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100), diodes (D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55, D56, D57, D58, D59, D60, D61, D62, D63, D64, D65, D66, D67, D68, D69, D70, D71, D72, D73, D74, D75, D76, D77, D78, D79, D80, D81, D82, D83, D84, D85, D86, D87, D88, D89, D90, D91, D92, D93, D94, D95, D96, D97, D98, D99, D100), and other components like JK2, JK3, JK4, JK5, JK6, JK7, JK8, JK9, JK10, JK11, JK12, JK13, JK14, JK15, JK16, JK17, JK18, JK19, JK20, JK21, JK22, JK23, JK24, JK25, JK26, JK27, JK28, JK29, JK30, JK31, JK32, JK33, JK34, JK35, JK36, JK37, JK38, JK39, JK40, JK41, JK42, JK43, JK44, JK45, JK46, JK47, JK48, JK49, JK50, JK51, JK52, JK53, JK54, JK55, JK56, JK57, JK58, JK59, JK60, JK61, JK62, JK63, JK64, JK65, JK66, JK67, JK68, JK69, JK70, JK71, JK72, JK73, JK74, JK75, JK76, JK77, JK78, JK79, JK80, JK81, JK82, JK83, JK84, JK85, JK86, JK87, JK88, JK89, JK90, JK91, JK92, JK93, JK94, JK95, JK96, JK97, JK98, JK99, JK100).

POWER BOARD: This section includes a terminal board with 5 pins:

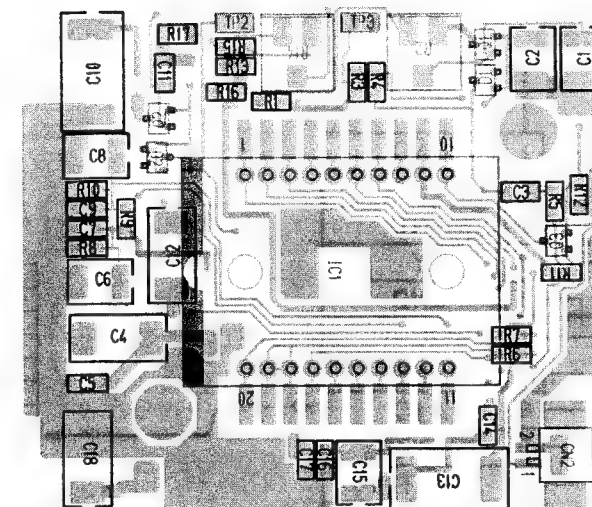
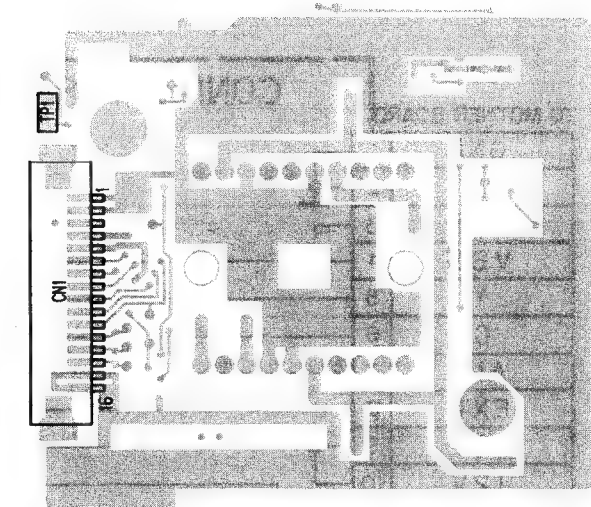
- Pin 1: DC12V
- Pin 2: GND(12V)
- Pin 3: AC24(-)
- Pin 4: AC24(+)
- Pin 5: GND

 The circuit features a transformer T1 (SCV2237-001, 180mA 250V) and a fuse F1 (T80mA 250V). It includes various resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100), capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100), and other components like D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55, D56, D57, D58, D59, D60, D61, D62, D63, D64, D65, D66, D67, D68, D69, D70, D71, D72, D73, D74, D75, D76, D77, D78, D79, D80, D81, D82, D83, D84, D85, D86, D87, D88, D89, D90, D91, D92, D93, D94, D95, D96, D97, D98, D99, D100).

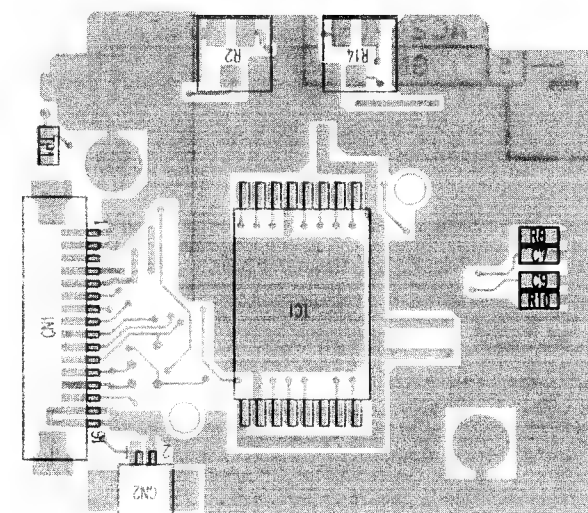
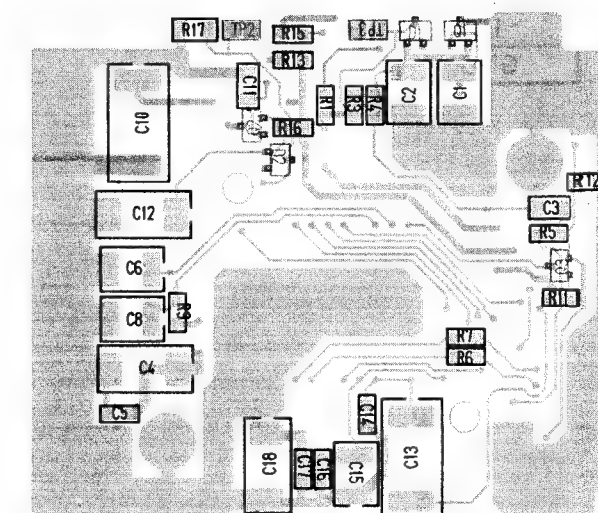
■ MOTHER CIRCUIT BOARD

Side A**Side B**

■ IMAGER CIRCUIT BOARD (TK-1280/1281)

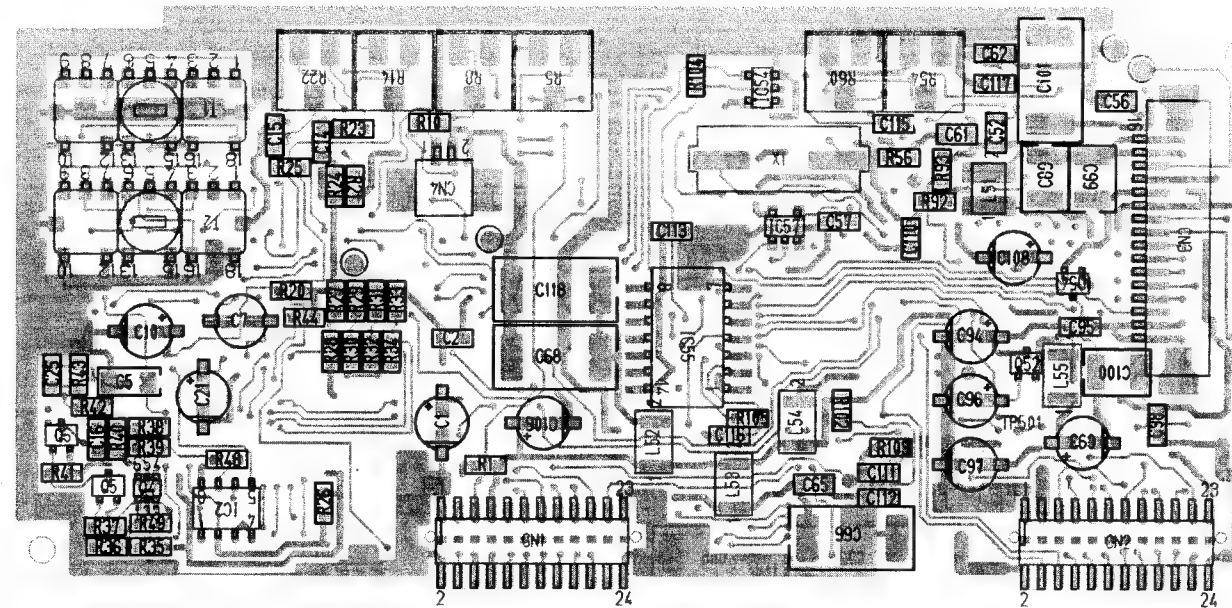
Side A**Side B**

■ IMAGER CIRCUIT BOARD (TK-1180)

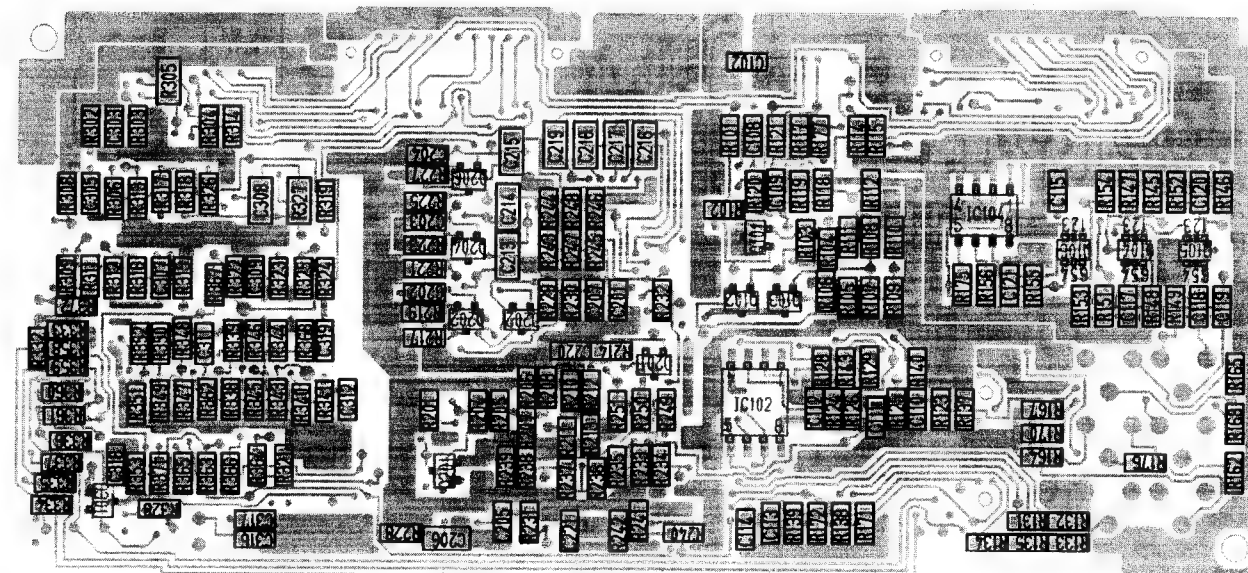
Side A**Side B**

■ CDS/TG CIRCUIT BOARD

Side A

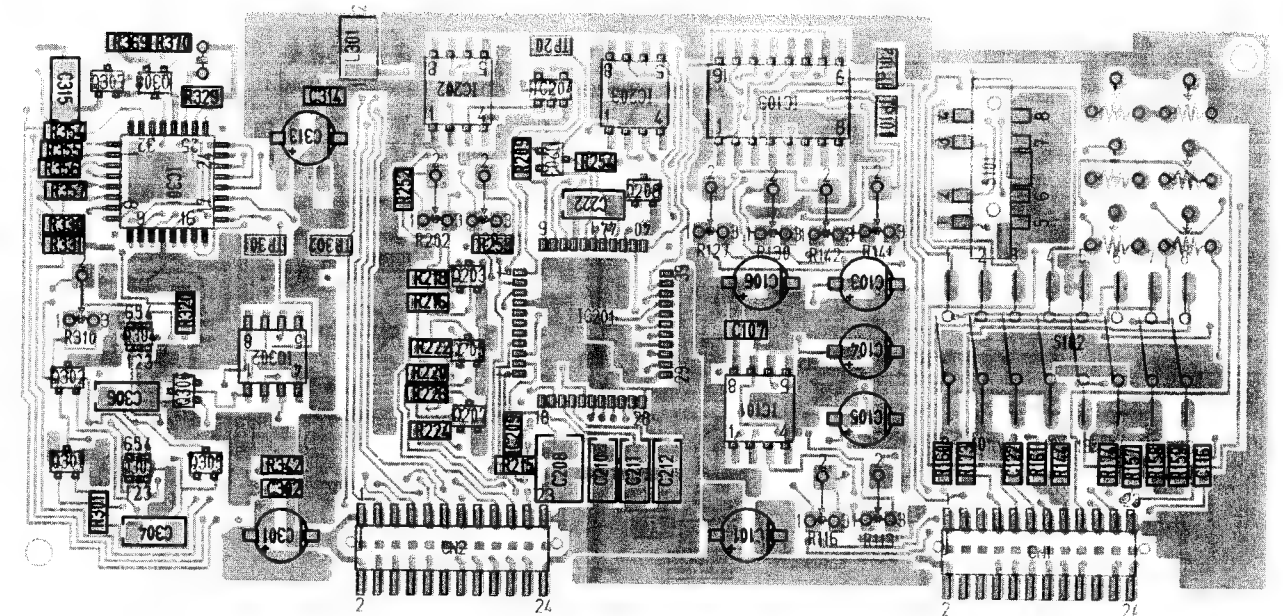


Side B

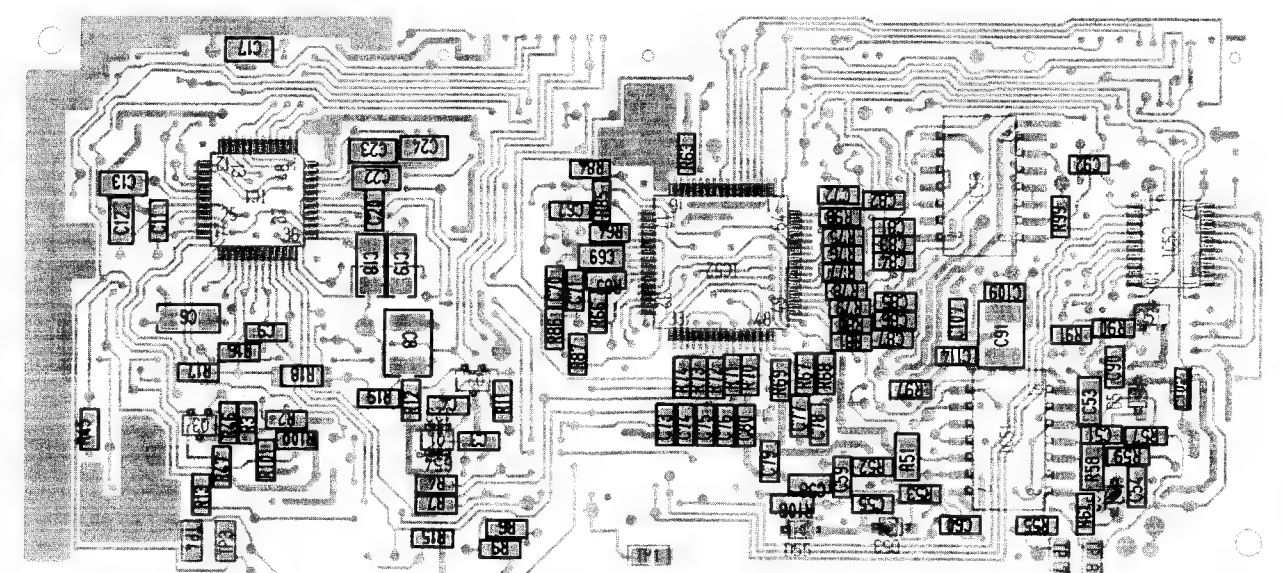


■ SSG/GENLOCK CIRCUIT BOARD

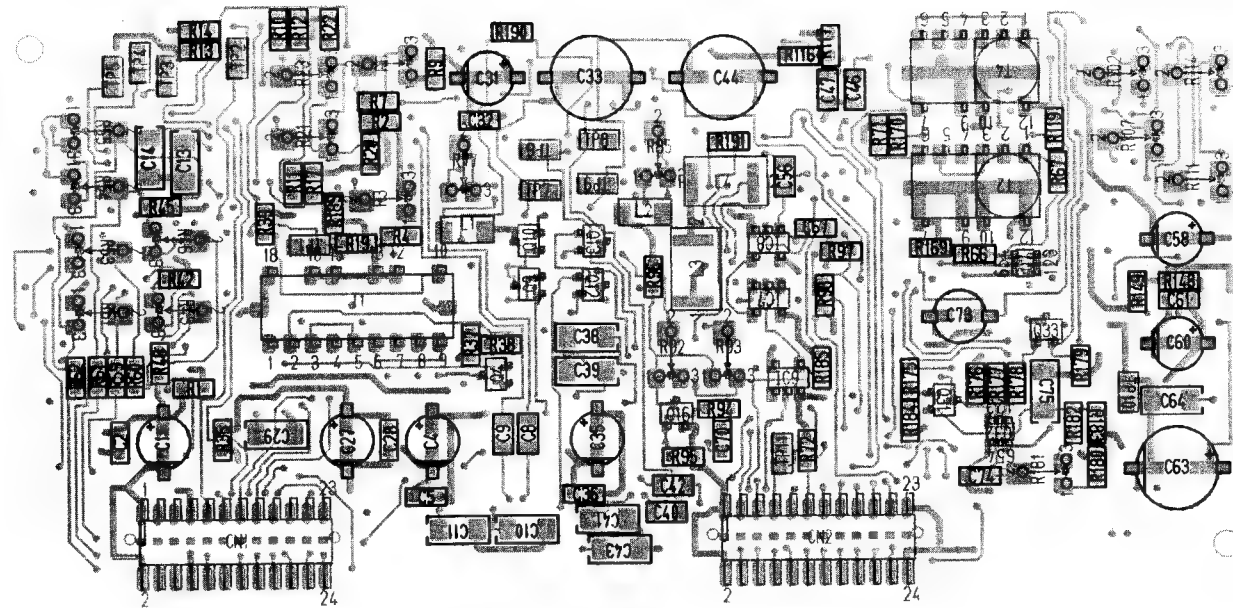
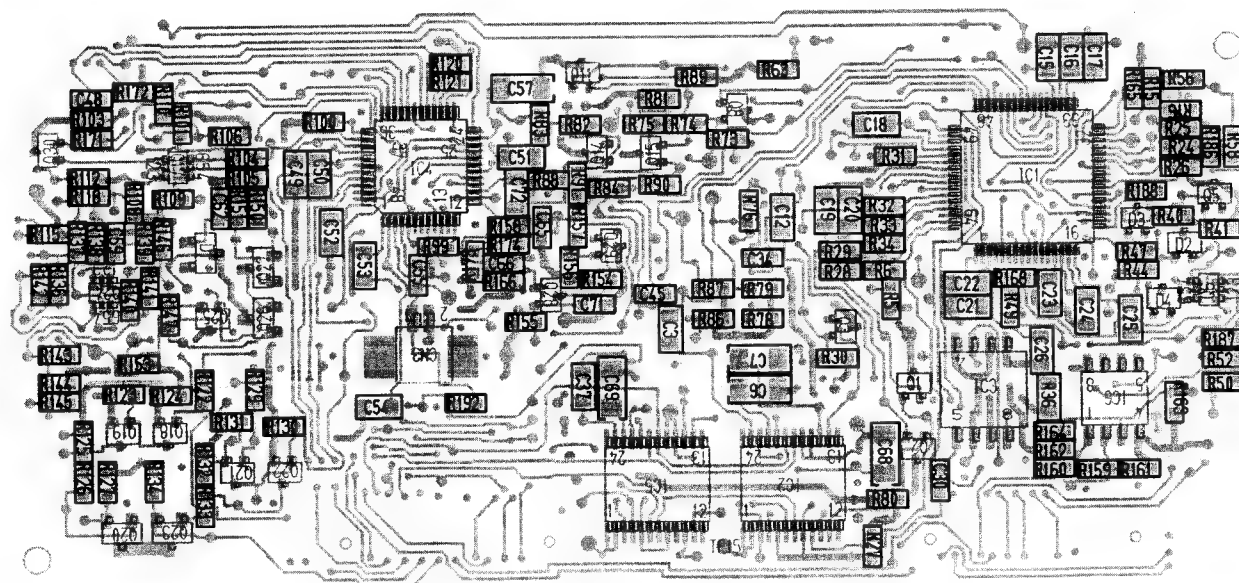
Side A



Side B

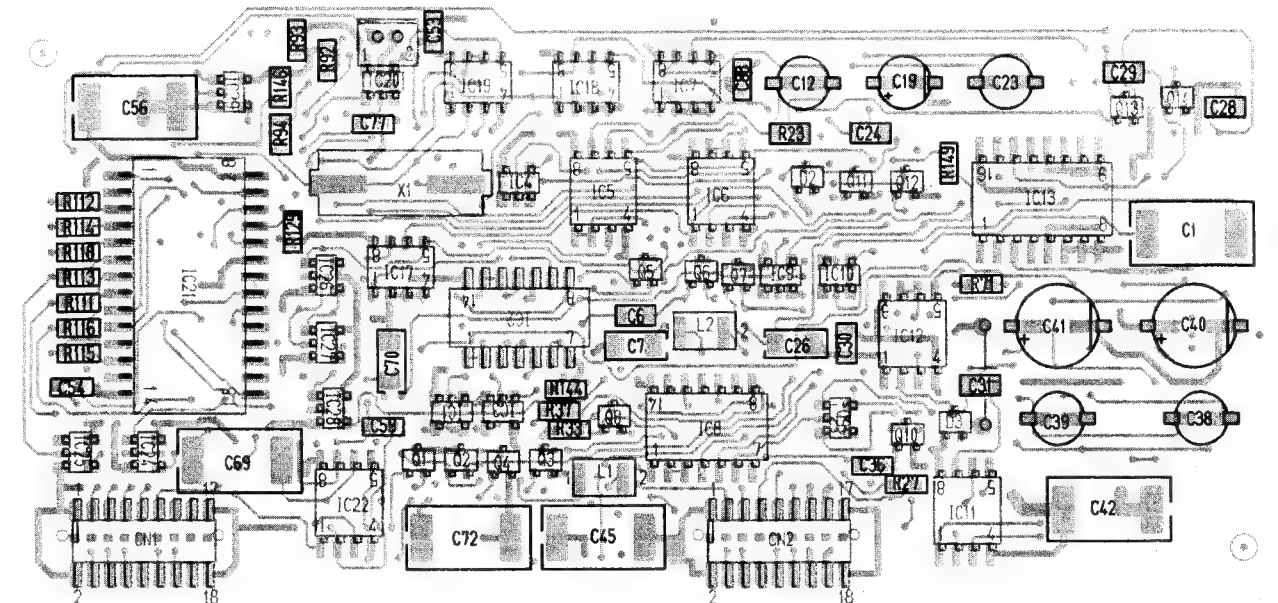
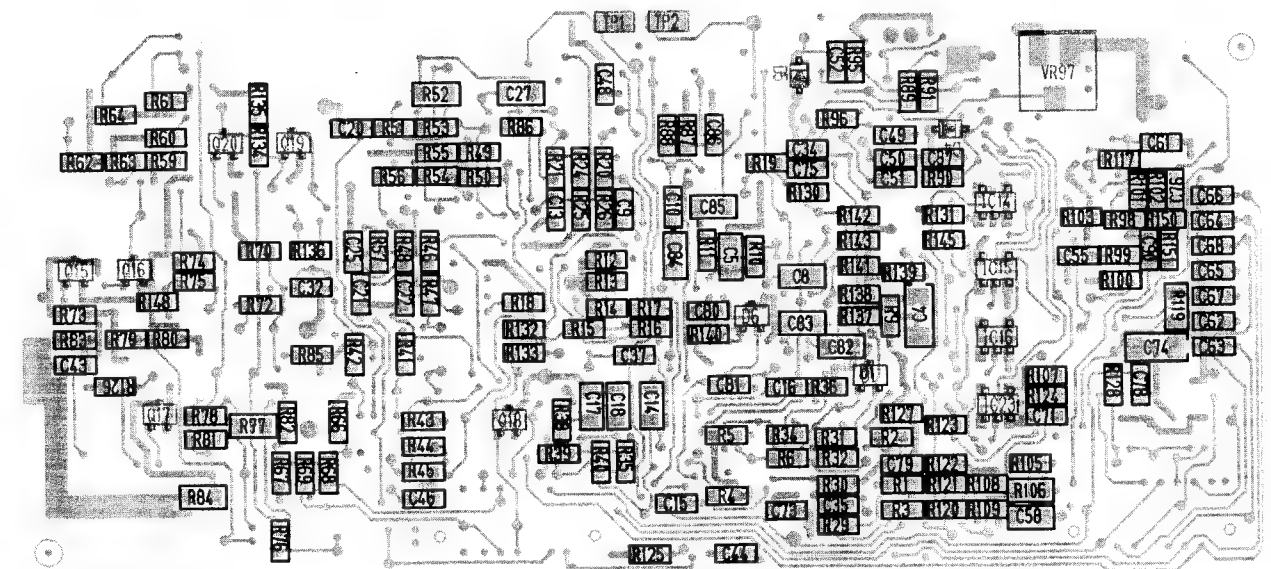


■ MAT/ENC CIRCUIT BOARD

Side A**Side B**

■ FEATURE CIRCUIT BOARD

Side A

**Side B**

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|---------------|-------------|
| C1 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C2 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C3 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C4 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C5 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C6 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C7 | NEE11HM-105 | E.CAPACITOR | 1.0 50V |
| C8 | NEE21CM-225 | TAN.CAPACITOR | 2.2 16V |
| C9 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C10 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C11 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C12 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C13 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C14 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C15 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C16 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C17 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C18 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C19 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C20 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C21 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C22 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C23 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C24 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C25 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C51 | NCT06CH-220 | CER.CAPACITOR | 22P 50V |
| C52 | NCT03CH-7R0 | CER.CAPACITOR | 7.0P 50V |
| C53 | NCT03UJ-150 | CER.CAPACITOR | 15P 50V |
| C54 | NCB31HK-102 | CER.CAPACITOR | 1000P 50V |
| C55 | NCB31HK-102 | CER.CAPACITOR | 1000P 50V |
| C59 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C60 | NCB31HK-102 | CER.CAPACITOR | 1000P 50V |
| C61 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C65 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C66 | NEE11CM-226 | TAN.CAPACITOR | 22 16V |
| C67 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C68 | NEE11CM-226 | TAN.CAPACITOR | 22 16V |
| C69 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C72 | NCB31HK-103 | CER.CAPACITOR | 0.010 50V |
| C73 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C74 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C75 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C76 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C77 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C78 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C79 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C80 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C81 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C83 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C84 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C85 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C86 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C87 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C89 | NEE21EM-155 | TAN.CAPACITOR | 1.5 25V |
| C90 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C91 | NEE21EM-155 | TAN.CAPACITOR | 1.5 25V |
| C92 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C93 | NEA11HM-335 | E.CAPACITOR | 3.3 50V |
| C94 | NEA11HM-335 | E.CAPACITOR | 3.3 50V |
| C95 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|---------------|-------------|
| C96 | NEA11HM-335 | E.CAPACITOR | 3.3 50V |
| C97 | NEA11HM-335 | E.CAPACITOR | 3.3 50V |
| C98 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C100 | NEA11HM-335 | E.CAPACITOR | 3.3 50V |
| C101 | NEE11EM-106 | TAN.CAPACITOR | 10 25V |
| C102 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C106 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C107 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C108 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C109 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C110 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C111 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C112 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C113 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C114 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C115 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C117 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C118 | NEE11CM-226 | TAN.CAPACITOR | 22 16V |
| L51 | CELP040-3R3 | COIL | 3.3UH |
| L52 | CELP008-100 | COIL | 10UH |
| L53 | CELP008-100 | COIL | 10UH |
| L54 | CELP008-100 | COIL | 10UH |
| X1 | CE42274-001 | CRYSTAL | 28.6363MHz |
| CN1 | CHB102W-24R | CONNECTOR | 24PIN |
| CN2 | CHB102W-24R | CONNECTOR | 24PIN |
| CN10 | CHC105S-16N | CONNECTOR | 16PIN |
| CN11 | SCV1770-002 | CONNECTOR | 2PIN |
| TP1 | SSV1096-001 | TEST POINT | |
| TP3 | SSV1096-001 | TEST POINT | |
| TP4 | SSV1096-001 | TEST POINT | |
| TP17 | SSV1096-001 | TEST POINT | |
| TP18 | SSV1096-001 | TEST POINT | |
| T1 | CE42162-001 | L.P.F. | TK-1280E |
| T1 | CE42207-001 | L.P.F. | TK-1180E |
| T2 | CE42163-001 | L.P.F. | TK-1280E |
| T2 | CE42208-001 | L.P.F. | TK-1180E |

● SSG/GL board assembly list 03

SCK2347-02-10B (TK-1280E/1281E)

SCK2347-02-11A (TK-1180E)

03□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|--------------|-----------------|-------------|
| IC1 | SC14S69F | I.C.(M) | TOSHIBA |
| IC2 | UPD5556G | I.C.(M) | NEC |
| IC3 | SC14S66F | I.C.(M) | TOSHIBA |
| IC4 | SC14S66F | I.C.(M) | TOSHIBA |
| IC5 | UPC842G | I.C.(M) | NEC |
| IC6 | UPC842G | I.C.(M) | NEC |
| IC7 | TC4W53F | I.C.(M) | TOSHIBA |
| IC8 | NJM1496M | I.C.(M) | JRC |
| IC9 | SC14S69F | I.C.(M) | TOSHIBA |
| IC10 | SC14S69F | I.C.(M) | TOSHIBA |
| IC11 | UPC358G | I.C.(M) | NEC |
| IC12 | TA7555F | I.C.(M) | TOSHIBA |
| IC13 | MC14046BF | I.C.(M) | MOTOROLA |
| IC14 | SC14S71F | I.C.(M) | TOSHIBA |
| IC15 | SC14S71F | I.C.(M) | TOSHIBA |
| IC17 | TC4W53F | I.C.(M) | TOSHIBA |
| IC18 | TC4W53F | I.C.(M) | TOSHIBA |
| IC19 | TC7W00F | I.C.(M) | TOSHIBA |
| IC21 | CXD1217M | I.C.(M) | SONY |
| IC22 | UPC842G | I.C.(M) | NEC |
| IC23 | SC14S81F | I.C.(M) | TOSHIBA |
| IC24 | SC14S71F | I.C.(M) | TOSHIBA |
| IC25 | SC14S69F | I.C.(M) | TOSHIBA |
| IC26 | SC14S11F | I.C.(M) | TOSHIBA |
| IC27 | SC14S81F | I.C.(M) | TOSHIBA |
| IC28 | SC14S81F | I.C.(M) | TOSHIBA |
| Q1 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q2 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q3 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q4 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q5 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q6 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q7 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q8 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q9 | FMS2 | TRANSISTOR | ROHM |
| Q10 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q11 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q12 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q13 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q14 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q15 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q16 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q17 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q18 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q19 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q20 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| D1 | MA142WK | DIODE | MATSUSHITA |
| D2 | MA142A | DIODE | MATSUSHITA |
| D3 | MA142A | DIODE | MATSUSHITA |
| D4 | HVU306A | VARI-CAPA DIODE | HITACHI |
| D5 | HVU306A | VARI-CAPA DIODE | HITACHI |
| D6 | MA142WK | DIODE | MATSUSHITA |
| R1 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R2 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R3 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R4 | NRSA63J-473 | M.G.RESISTOR | 47K 1/16W |

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|--------------|-------------|
| R5 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R6 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R9 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R10 | NRSA63J-122 | M.G.RESISTOR | 1.2K 1/16W |
| R11 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R12 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R13 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R14 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R15 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R16 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R17 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R18 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R19 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R20 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R21 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R23 | NRSA02J-105 | M.G.RESISTOR | 1.0M 1/10W |
| R24 | NRSA63J-334 | M.G.RESISTOR | 330K 1/16W |
| R25 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R26 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R27 | NRSA63J-184 | M.G.RESISTOR | 180K 1/16W |
| R29 | NRSA63J-682 | M.G.RESISTOR | 6.8K 1/16W |
| R30 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R31 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R32 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R33 | NRSA63J-272 | M.G.RESISTOR | 2.7K 1/16W |
| R34 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R35 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R36 | NRSA63J-272 | M.G.RESISTOR | 2.7K 1/16W |
| R37 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R38 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R39 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R40 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R41 | NRSA63J-331 | M.G.RESISTOR | 330 1/16W |
| R42 | NRSA63J-331 | M.G.RESISTOR | 330 1/16W |
| R43 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R44 | NRSA63J-473 | M.G.RESISTOR | 47K 1/16W |
| R45 | NRSA63J-153 | M.G.RESISTOR | 15K 1/16W |
| R46 | NRSA63J-823 | M.G.RESISTOR | 82K 1/16W |
| R47 | NRSA63J-473 | M.G.RESISTOR | 47K 1/16W |
| R48 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R49 | NRSA63J-333 | M.G.RESISTOR | 33K 1/16W |
| R50 | NRSA63J-683 | M.G.RESISTOR | 68K 1/16W |
| R51 | NRSA63J-273 | M.G.RESISTOR | 27K 1/16W |
| R52 | NRSA02J-105 | M.G.RESISTOR | 1.0M 1/10W |
| R53 | NRSA63J-393 | M.G.RESISTOR | 39K 1/16W |
| R54 | NRSA63J-274 | M.G.RESISTOR | 270K 1/16W |
| R55 | NRSA63J-392 | M.G.RESISTOR | 3.9K 1/16W |
| R56 | NRSA63J-104 | M.G.RESISTOR | 100K 1/16W |
| R57 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R59 | NRSA63J-822 | M.G.RESISTOR | 8.2K 1/16W |
| R60 | NRSA63J-123 | M.G.RESISTOR | 12K 1/16W |
| R61 | NRSA63J-272 | M.G.RESISTOR | 2.7K 1/16W |
| R62 | NRSA63J-331 | M.G.RESISTOR | 330 1/16W |
| R63 | NRSA63J-473 | M.G.RESISTOR | 47K 1/16W |
| R64 | NRSA63J-223 | M.G.RESISTOR | 22K 1/16W |
| R66 | NRSA63J-563 | M.G.RESISTOR | 56K 1/16W |
| R67 | NRSA63J-563 | M.G.RESISTOR | 56K 1/16W |
| R68 | NRSA63J-563 | M.G.RESISTOR | 56K 1/16W |
| R69 | NRSA63J-563 | M.G.RESISTOR | 56K 1/16W |

| Symbol No. | Part No. | Part Name | Description | | Symbol No. | Part No. | Part Name | Description | |
|------------|--------------|---------------|-------------|-------|------------|-------------|-----------------|-------------|----------------|
| R70 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | R139 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W |
| R71 | NRSA63J-563 | M.G.RESISTOR | 56K | 1/16W | R140 | NRSA63J-683 | M.G.RESISTOR | 68K | 1/16W |
| R72 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | R141 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W |
| R73 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | R142 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W |
| R74 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W | R144 | NRSA63J-474 | M.G.RESISTOR | 470K | 1/16W |
| R75 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | R148 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W |
| R76 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W | R153 | NRSA63J-681 | M.G.RESISTOR | 680 | 1/16W TK-1280E |
| | | | | | R153 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W TK-1180E |
| R77 | NRSA02J-105 | M.G.RESISTOR | 1.0M | 1/10W | C1 | NEE11CM-106 | TAN.CAPACITOR | 10 | 16V |
| R78 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W | C4 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R79 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | C5 | NCB21HK-223 | CER.CAPACITOR | 0.022 | 50V |
| R80 | NRSA63J-123 | M.G.RESISTOR | 12K | 1/16W | C6 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R81 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W | C7 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R84 | NRSA02J-101 | M.G.RESISTOR | 100 | 1/10W | C8 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R85 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C9 | NCB31HK-472 | CER.CAPACITOR | 4700P | 50V |
| R87 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C10 | NCB31HK-472 | CER.CAPACITOR | 4700P | 50V |
| R88 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W | C12 | NEN11EM-475 | E.CAPACITOR | 4.7 | 25V |
| R90 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C13 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R91 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C14 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R92 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C15 | NCT06CH-560 | CER.CAPACITOR | 56P | 50V |
| R93 | NRSA63J-151 | M.G.RESISTOR | 150 | 1/16W | C16 | NCB31HK-102 | CER.CAPACITOR | 1000P | 50V |
| R94 | NRSA02J-105 | M.G.RESISTOR | 1.0M | 1/10W | C17 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R95 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C18 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R96 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C19 | NEA11CM-106 | E.CAPACITOR | 10 | 16V |
| R97 | CEVP006-103 | TRIM.RESISTOR | 10K | 4fsc | C20 | NCB31HK-222 | CER.CAPACITOR | 2200P | 50V |
| R99 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C21 | NCT06CH-181 | CER.CAPACITOR | 180P | 50V |
| R102 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C22 | NCT06CH-271 | CER.CAPACITOR | 270P | 50V |
| R103 | NRSA63J-100 | M.G.RESISTOR | 10 | 1/16W | C23 | NEN11HM-105 | E.CAPACITOR | 1.0 | 50V |
| R105 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | C24 | NCT03CH-102 | CER.CAPACITOR | 1000P | 50V |
| R106 | NRSA02J-105 | M.G.RESISTOR | 1.0M | 1/10W | C26 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R107 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | C27 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R108 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | C28 | NCB21HK-273 | CER.CAPACITOR | 0.027 | 50V |
| R109 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | C29 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R111 | NRSA63J-222 | M.G.RESISTOR | 2.2K | 1/16W | C30 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R112 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C31 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R113 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C32 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R114 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C33 | QFV41HJ-105 | MYLAR CAPACITOR | 1.0 | 50V |
| R115 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C34 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R116 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C35 | NCT06CH-470 | CER.CAPACITOR | 47P | 50V |
| R117 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C36 | NCT06CH-470 | CER.CAPACITOR | 47P | 50V |
| R118 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | C37 | NCT06CH-560 | CER.CAPACITOR | 56P | 50V |
| R119 | NRVA02D-5601 | M.F.RESISTOR | 56 | 1/10W | C38 | NEN11HM-105 | E.CAPACITOR | 1.0 | 50V |
| R120 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W | C39 | NEN11HM-474 | E.CAPACITOR | 0.47 | 50V |
| R121 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W | C40 | NEA11CM-476 | E.CAPACITOR | 47 | 16V |
| R122 | NRSA63J-392 | M.G.RESISTOR | 3.9K | 1/16W | C41 | NEA11CM-476 | E.CAPACITOR | 47 | 16V |
| R123 | NRSA63J-682 | M.G.RESISTOR | 6.8K | 1/16W | C42 | NEE11CM-226 | TAN.CAPACITOR | 22 | 16V |
| R124 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C43 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R125 | NRSA63J-182 | M.G.RESISTOR | 1.8K | 1/16W | C44 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R126 | NRSA63J-123 | M.G.RESISTOR | 12K | 1/16W | C45 | NEE11CM-226 | TAN.CAPACITOR | 22 | 16V |
| R127 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C46 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R128 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C48 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R129 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C49 | NCT06CH-330 | CER.CAPACITOR | 33P | 50V |
| R130 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C52 | NCB31HK-102 | CER.CAPACITOR | 1000P | 50V |
| R132 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W | C53 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R133 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W | C54 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R134 | NRSA63J-274 | M.G.RESISTOR | 270K | 1/16W | C55 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R135 | NRSA63J-392 | M.G.RESISTOR | 3.9K | 1/16W | C56 | NEE11CM-226 | TAN.CAPACITOR | 22 | 16V |
| R136 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C58 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R137 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | | | | | |
| R138 | NRSA02J-474 | M.G.RESISTOR | 470K | 1/10W | | | | | |

● MAT/ENC board assembly list 04
 SCK2348-02-40B (TK-1280E/1281E)
 SCK2349-02-61A (TK-1180E)

04□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|---------------|--------------|
| C59 | NCB31HK-103 | CER.CAPACITOR | 0.010 50V |
| C60 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C62 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C63 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C64 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C65 | NCT06CH-391 | CER.CAPACITOR | 390P 50V |
| C66 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C67 | NCT06CH-470 | CER.CAPACITOR | 47P 50V |
| C69 | NEE11CM-106 | TAN.CAPACITOR | 10 16V |
| C70 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C72 | NEE11CM-226 | TAN.CAPACITOR | 22 16V |
| C73 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C74 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C76 | NCB31HK-103 | CER.CAPACITOR | 0.010 50V |
| C79 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C80 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C81 | NCT06CH-101 | CER.CAPACITOR | 100P 50V |
| C82 | NCT03CH-102 | CER.CAPACITOR | 1000P 50V |
| C83 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C84 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C85 | NCT03CH-102 | CER.CAPACITOR | 1000P 50V |
| C86 | NCB31HK-102 | CER.CAPACITOR | 1000P 50V |
| C88 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| L1 | CELP008-220 | COIL | 22UH |
| L2 | CELP008-220 | COIL | 22UH |
| X1 | CE42275-001 | CRYSTAL | 17.734475MHz |
| CN3 | CHB102W-18R | CONNECTOR | 18PIN |
| CN4 | CHB102W-18R | CONNECTOR | 18PIN |
| CN12 | SCV1978-S02 | CONNECTOR | 2PIN |
| TP1 | SSV1096-001 | TEST POINT | |
| TP2 | SSV1096-001 | TEST POINT | |

| Symbol No. | Part No. | Part Name | Description |
|------------|--------------|---------------|---------------------|
| IC1 | CXA1391R | I.C.(M) | SONY |
| IC2 | CXL1517N | I.C.(M) | SONY TK-1280E |
| IC2 | CXL1518N | I.C.(M) | SONY TK-1180E |
| IC3 | CXL5504M | I.C.(M) | SONY |
| IC4 | CXA1592R | I.C.(M) | SONY |
| IC5 | CXL1517N | I.C.(M) | SONY TK-1280E |
| IC5 | CXL1518N | I.C.(M) | SONY TK-1180E |
| IC6 | UPC4558G | I.C.(M) | NEC |
| IC7 | SC14S11F | I.C.(M) | TOSHIBA |
| IC8 | TC7S66F | I.C.(M) | TOSHIBA |
| Q1 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q2 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q3 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q4 | 2SA1532(ABC) | TRANSISTOR | MATSUSHITA |
| Q5 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q6 | XP4501 | TRANSISTOR | MATSUSHITA |
| Q7 | XP4501 | TRANSISTOR | MATSUSHITA |
| Q8 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q9 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q10 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q11 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q12 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q13 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q14 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q15 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q16 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q17 | XP4501 | TRANSISTOR | MATSUSHITA |
| Q18 | 2SC3930(ABC) | TRANSISTOR | MATSUSHITA TK-1280E |
| Q19 | 2SA1532(ABC) | TRANSISTOR | MATSUSHITA TK-1280E |
| Q20 | 2SD1030(RS) | TRANSISTOR | MATSUSHITA TK-1280E |
| Q21 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q22 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q23 | 2SD1030(RS) | TRANSISTOR | MATSUSHITA |
| Q24 | XP6534 | TRANSISTOR | MATSUSHITA |
| Q25 | 2SC3930(ABC) | TRANSISTOR | MATSUSHITA |
| Q26 | 2SD1030(RS) | TRANSISTOR | MATSUSHITA |
| Q27 | 2SD601(QR) | TRANSISTOR | MATSUSHITA |
| Q28 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q29 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q30 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q31 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q32 | XP6435 | TRANSISTOR | MATSUSHITA |
| Q33 | 2SC3930(ABC) | TRANSISTOR | MATSUSHITA |
| D1 | MA3056(L) | ZENER DIODE | MATSUSHITA |
| D2 | MA147 | DIODE | MATSUSHITA |
| D3 | MA142K | DIODE | MATSUSHITA |
| D4 | MA147 | DIODE | MATSUSHITA |
| R1 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R2 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R3 | CEVP005-332 | TRIM.RESISTOR | 3.3K Y1.Y2.GAIN |
| R4 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R6 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R7 | NRSA63J-152 | M.G.RESISTOR | 1.5K 1/16W |
| R8 | CEVP005-472 | TRIM.RESISTOR | 4.7K C1.GAIN |
| R9 | NRSA63J-822 | M.G.RESISTOR | 8.2K 1/16W |
| R10 | NRSA63J-124 | M.G.RESISTOR | 120K 1/16W |

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|---------------|-----------------|
| R11 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R12 | NRSA63J-123 | M.G.RESISTOR | 12K 1/16W |
| R13 | NRSA63J-822 | M.G.RESISTOR | 8.2K 1/16W |
| R14 | NRSA63J-822 | M.G.RESISTOR | 8.2K 1/16W |
| R15 | NRSA63J-822 | M.G.RESISTOR | 8.2K 1/16W |
| R16 | NRSA63J-822 | M.G.RESISTOR | 8.2K 1/16W |
| R17 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R20 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R21 | CEVP005-103 | TRIM.RESISTOR | 10K R.GAIN |
| R22 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R23 | CEVP005-103 | TRIM.RESISTOR | 10K B.GAIN |
| R24 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R26 | NRSA63J-123 | M.G.RESISTOR | 12K 1/16W |
| R27 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R28 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R29 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R30 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R31 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R32 | NRSA63J-183 | M.G.RESISTOR | 18K 1/16W |
| R33 | NRSA63J-273 | M.G.RESISTOR | 27K 1/16W |
| R34 | NRSA63J-153 | M.G.RESISTOR | 15K 1/16W |
| R35 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R36 | NRSA02J-105 | M.G.RESISTOR | 1.0M 1/10W |
| R37 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R38 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R39 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R40 | NRSA63J-682 | M.G.RESISTOR | 6.8K 1/16W |
| R41 | NRSA63J-272 | M.G.RESISTOR | 2.7K 1/16W |
| R42 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R43 | CEVP005-682 | TRIM.RESISTOR | 6.8K V.APA CON |
| R44 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R45 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R46 | CEVP005-682 | TRIM.RESISTOR | 6.8K DL.YH.GAIN |
| R47 | NRSA63J-472 | M.G.RESISTOR | 4.7K 1/16W |
| R48 | NRSA63J-123 | M.G.RESISTOR | 12K 1/16W |
| R49 | NRSA63J-123 | M.G.RESISTOR | 12K 1/16W |
| R50 | NRSA63J-561 | M.G.RESISTOR | 560 1/16W |
| R51 | CEVP005-103 | TRIM.RESISTOR | 10K R-Y.GAIN |
| R52 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R53 | CEVP005-103 | TRIM.RESISTOR | 10K B-Y.GAIN |
| R54 | CEVP005-103 | TRIM.RESISTOR | 10K B-Y.HUE |
| R55 | CEVP005-103 | TRIM.RESISTOR | 10K R-Y.HUE |
| R56 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R58 | NRSA63J-153 | M.G.RESISTOR | 15K 1/16W |
| R63 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R66 | NRSA63J-392 | M.G.RESISTOR | 3.9K 1/16W |
| R67 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R71 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R72 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R73 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R74 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R75 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R76 | NRSA63J-182 | M.G.RESISTOR | 1.8K 1/16W |
| R77 | CEVP005-682 | TRIM.RESISTOR | 6.8K R-Y1.GAIN |
| R78 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R79 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R80 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R81 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R82 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|---------------|---------------------|
| R148 | NRSA63J-100 | M.G.RESISTOR | 10 1/16W |
| R149 | NRSA63J-560 | M.G.RESISTOR | 56 1/16W |
| R150 | NRSA63J-560 | M.G.RESISTOR | 56 1/16W |
| R151 | NRSA63J-391 | M.G.RESISTOR | 390 1/16W |
| R153 | NRSA63J-104 | M.G.RESISTOR | 100K 1/16W |
| R154 | NRSA63J-182 | M.G.RESISTOR | 1.8K 1/16W |
| R155 | NRSA63J-122 | M.G.RESISTOR | 1.2K 1/16W |
| R156 | NRSA63J-392 | M.G.RESISTOR | 3.9K 1/16W |
| R157 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R158 | NRSA63J-152 | M.G.RESISTOR | 1.5K 1/16W |
| R159 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R164 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R166 | NRSA63J-392 | M.G.RESISTOR | 3.9K 1/16W |
| R168 | NRSA63J-333 | M.G.RESISTOR | 33K 1/16W |
| R169 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R170 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R171 | NRSA63J-183 | M.G.RESISTOR | 18K 1/16W |
| R172 | NRSA63J-182 | M.G.RESISTOR | 1.8K 1/16W |
| R173 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R175 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R176 | NRSA63J-152 | M.G.RESISTOR | 1.5K 1/16W |
| R177 | NRSA63J-391 | M.G.RESISTOR | 390 1/16W |
| R178 | NRSA63J-151 | M.G.RESISTOR | 150 1/16W |
| R179 | NRSA63J-392 | M.G.RESISTOR | 3.9K 1/16W |
| R180 | NRSA63J-152 | M.G.RESISTOR | 1.5K 1/16W |
| R181 | CEVP005-681 | TRIM.RESISTOR | 680 Y.KNEE |
| R182 | NRSA63J-821 | M.G.RESISTOR | 820 1/16W |
| R183 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R185 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R186 | NRSA63J-222 | M.G.RESISTOR | 2.2K 1/16W |
| R187 | NRSA63J-333 | M.G.RESISTOR | 33K 1/16W |
| R188 | NRSA63J-333 | M.G.RESISTOR | 33K 1/16W |
| R190 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R191 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R193 | NRSA63J-272 | M.G.RESISTOR | 2.7K 1/16W TK-1280E |
| C1 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C2 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C3 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C4 | NEA11CM-106 | E.CAPACITOR | 10 16V |
| C5 | NCF31CZ-104 | CER.CAPACITOR | 0.10 16V |
| C6 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C7 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C8 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C9 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C10 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C11 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C12 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C13 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C14 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C15 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C16 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C17 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C18 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C19 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C20 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C21 | NCF21CZ-105 | CER.CAPACITOR | 1.0 16V |
| C22 | NCF21CZ-105 | CER.CAPACITOR | 1.0 16V |

| Symbol No. | Part No. | Part Name | Description | | Symbol No. | Part No. | Part Name | Description | |
|------------|-------------|---------------|-------------|----------------|------------|-------------|---------------|-------------|--------------|
| R83 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C23 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R84 | NRSA63J-182 | M.G.RESISTOR | 1.8K | 1/16W | C24 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R85 | CEVPO05-682 | TRIM.RESISTOR | 6.8K | B-Y1.GAIN | C25 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R86 | NRSA63J-222 | M.G.RESISTOR | 2.2K | 1/16W | C26 | NCF21CZ-105 | CER.CAPACITOR | 1.0 | 16V |
| R87 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W | C27 | NEA11CM-106 | E.CAPACITOR | 10 | 16V |
| R88 | NRSA63J-222 | M.G.RESISTOR | 2.2K | 1/16W | C28 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R89 | NRSA63J-222 | M.G.RESISTOR | 2.2K | 1/16W | C29 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R90 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | C30 | NCB31HK-102 | CER.CAPACITOR | 1000P | 50V |
| R91 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | C31 | NEA11CM-106 | E.CAPACITOR | 10 | 16V |
| R92 | CEVPO05-223 | TRIM.RESISTOR | 22K | R-Y.OFFSET | C32 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R93 | CEVPO05-223 | TRIM.RESISTOR | 22K | B-Y.OFFSET | C33 | NEN11AM-336 | E.CAPACITOR | 33 | 10V |
| R94 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C34 | NCT06CH-390 | CER.CAPACITOR | 39P | 50V |
| R95 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | C35 | NEA11CM-106 | E.CAPACITOR | 10 | 16V |
| R96 | NRSA63J-152 | M.G.RESISTOR | 1.5K | 1/16W | C36 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R99 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C37 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R100 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | C38 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R101 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C39 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R102 | CEVPO05-103 | TRIM.RESISTOR | 10K | BURST | C40 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R103 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W | C41 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R104 | NRSA63J-682 | M.G.RESISTOR | 6.8K | 1/16W | C42 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R105 | NRSA63J-682 | M.G.RESISTOR | 6.8K | 1/16W | C43 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R106 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W | C44 | NEN11AM-336 | E.CAPACITOR | 33 | 10V |
| R107 | CEVPO05-682 | TRIM.RESISTOR | 6.8K | APL | C45 | NCT06CH-390 | CER.CAPACITOR | 39P | 50V |
| R108 | NRSA63J-682 | M.G.RESISTOR | 6.8K | 1/16W | C46 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R109 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W | C47 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R110 | NRSA63J-392 | M.G.RESISTOR | 3.9K | 1/16W | C48 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R111 | CEVPO05-103 | TRIM.RESISTOR | 10K | Y.GAIN | C49 | NCF21CZ-105 | CER.CAPACITOR | 1.0 | 16V |
| R112 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C50 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R114 | CEVPO05-103 | TRIM.RESISTOR | 10K | Y.SETUP | C51 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R115 | NRSA63J-222 | M.G.RESISTOR | 2.2K | 1/16W | C52 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R117 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C53 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R119 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C54 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R120 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C55 | NCB31HK-102 | CER.CAPACITOR | 1000P | 50V |
| R121 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C56 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R122 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W TK-1280E | C57 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R123 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W TK-1280E | C58 | NEA10GM-476 | E.CAPACITOR | 47 | 4V |
| R124 | NRSA63J-122 | M.G.RESISTOR | 1.2K | 1/16W TK-1280E | C59 | NCT06CH-9R0 | CER.CAPACITOR | 9.0P | 50V |
| R125 | NRSA63J-122 | M.G.RESISTOR | 1.2K | 1/16W TK-1280E | C60 | NEA11CM-106 | E.CAPACITOR | 10 | 16V |
| R126 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W TK-1280E | C61 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R127 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W TK-1280E | C62 | NCB31HK-102 | CER.CAPACITOR | 1000P | 50V |
| R129 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W | C63 | NEA10JM-107 | E.CAPACITOR | 100 | 6.3V |
| R130 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W | C64 | NEE21CM-684 | TAN.CAPACITOR | 0.68 | 16V |
| R131 | NRSA63J-122 | M.G.RESISTOR | 1.2K | 1/16W | C65 | NCT06CH-151 | CER.CAPACITOR | 150P | 50V |
| R132 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W TK-1280E | C66 | NCT06CH-180 | CER.CAPACITOR | 18P | 50V |
| R132 | NRSA63J-122 | M.G.RESISTOR | 1.2K | 1/16W TK-1180E | C67 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R133 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W | C68 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R134 | NRSA63J-392 | M.G.RESISTOR | 3.9K | 1/16W | C69 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R136 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | C70 | NCT06CH-101 | CER.CAPACITOR | 100P | 50V |
| R137 | NRSA63J-123 | M.G.RESISTOR | 12K | 1/16W | C71 | NCT06CH-180 | CER.CAPACITOR | 18P | 50V |
| R138 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W | C72 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R139 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C73 | NEN11HM-105 | E.CAPACITOR | 1.0 | 50V |
| R140 | NRSA63J-471 | M.G.RESISTOR | 470 | 1/16W | C74 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R141 | NRSA63J-681 | M.G.RESISTOR | 680 | 1/16W | C75 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R142 | NRSA63J-222 | M.G.RESISTOR | 2.2K | 1/16W | C76 | NCT06CH-271 | CER.CAPACITOR | 270P | 50V TK-1180E |
| R143 | NRSA63J-123 | M.G.RESISTOR | 12K | 1/16W | C77 | NCT06CH-271 | CER.CAPACITOR | 270P | 50V TK-1180E |
| R144 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | C78 | NCT06CH-390 | CER.CAPACITOR | 39P | 50V TK-1180E |
| R145 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | L1 | CE41131-330 | INDUCTOR | 33UH | |
| R146 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | L2 | CE41131-330 | INDUCTOR | 33UH | |
| R147 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W | L3 | CE40344-8R2 | INDUCTOR | 8.2UH | |

● FEATURE board assembly list 05

SCK2347-03-40B (TK-1280E/1281E)

SCK2347-03-61A (TK-1180E)

05□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|------------|-------------|
| L4 | CE40344-680 | INDUCTOR | 68UH |
| CN5 | CHB102W-24R | CONNECTOR | 24PIN |
| CN6 | CHB102W-24R | CONNECTOR | 24PIN |
| CN12 | SCV1770-002 | CONNECTOR | 2PIN |
| TP1 | SSV1096-001 | TEST POINT | |
| TP2 | SSV1096-001 | TEST POINT | |
| TP3 | SSV1096-001 | TEST POINT | |
| TP6 | SSV1096-001 | TEST POINT | |
| TP7 | SSV1096-001 | TEST POINT | |
| TP8 | SSV1096-001 | TEST POINT | |
| TP9 | SSV1096-001 | TEST POINT | |
| TP11 | SSV1096-001 | TEST POINT | |
| T1 | CE42206-001 | L.P.F. | |
| T2 | CE41920-00A | L.P.F. | |
| T4 | CE41919-00A | L.P.F. | TK-1280E |
| T4 | CE42017-00A | L.P.F. | TK-1180E |

| Symbol No. | Part No. | Part Name | Description |
|------------|--------------|---------------|-------------|
| IC101 | UPC358G | I.C.(M) | NEC |
| IC102 | UPC358G | I.C.(M) | NEC |
| IC103 | TC4052BF | I.C.(M) | TOSHIBA |
| IC104 | TC4W53F | I.C.(M) | TOSHIBA |
| IC201 | HA118118MA | I.C.(M) | HITACHI |
| IC202 | TA7555F | I.C.(M) | TOSHIBA |
| IC203 | UPC358G | I.C.(M) | NEC |
| IC204 | SC14S81F | I.C.(M) | TOSHIBA |
| IC301 | SC405628FB | I.C.(M) | MOTOROLA |
| IC302 | UPC4558G | I.C.(M) | NEC |
| Q101 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q102 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q103 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q104 | XP4501 | TRANSISTOR | MATSUSHITA |
| Q105 | XP6401 | TRANSISTOR | MATSUSHITA |
| Q106 | XP4501 | TRANSISTOR | MATSUSHITA |
| Q201 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q202 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q203 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q204 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q205 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q206 | 2SC3936(BC) | TRANSISTOR | MATSUSHITA |
| Q207 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q208 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q301 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q302 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q303 | XP4601 | TRANSISTOR | MATSUSHITA |
| Q304 | XP4601 | TRANSISTOR | MATSUSHITA |
| Q305 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q306 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| Q307 | 2SB1218A(QR) | TRANSISTOR | MATSUSHITA |
| Q308 | 2SD1819A(QR) | TRANSISTOR | MATSUSHITA |
| D202 | MA142K | DIODE | MATSUSHITA |
| D203 | MA142K | DIODE | MATSUSHITA |
| D301 | MA142K | DIODE | MATSUSHITA |
| R101 | NRSA63J-101 | M.G.RESISTOR | 100 1/16W |
| R102 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R103 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R104 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R105 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R107 | NRSA63J-102 | M.G.RESISTOR | 1.0K 1/16W |
| R108 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R109 | NRSA63J-0R0 | M.G.RESISTOR | 0 1/16W |
| R110 | NRSA63J-224 | M.G.RESISTOR | 220K 1/16W |
| R111 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R112 | NRSA63J-562 | M.G.RESISTOR | 5.6K 1/16W |
| R113 | CEVP005-102 | TRIM.RESISTOR | 1K GAIN |
| R114 | NRSA63J-332 | M.G.RESISTOR | 3.3K 1/16W |
| R115 | NRSA63J-223 | M.G.RESISTOR | 22K 1/16W |
| R116 | CEVP005-473 | TRIM.RESISTOR | 47K AGC |
| R117 | NRSA63J-331 | M.G.RESISTOR | 330 1/16W |
| R118 | NRSA63J-272 | M.G.RESISTOR | 2.7K 1/16W |
| R119 | NRSA63J-392 | M.G.RESISTOR | 3.9K 1/16W |
| R120 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |
| R121 | NRSA63J-103 | M.G.RESISTOR | 10K 1/16W |

| Symbol No. | Part No. | Part Name | Description | | Symbol No. | Part No. | Part Name | Description | |
|------------|-------------|---------------|-------------|------------|------------|-------------|---------------|-------------|----------|
| R122 | QVPC406-103 | TRIM.RESISTOR | 10K | R-B | R206 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R123 | NRSA63J-393 | M.G.RESISTOR | 39K | 1/16W | R207 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R124 | NRSA63J-183 | M.G.RESISTOR | 18K | 1/16W | R208 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R125 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W | R209 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R126 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | R210 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R127 | CEVPO05-332 | TRIM.RESISTOR | 3.3K | R.OFFSET | R211 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R128 | NRSA63J-183 | M.G.RESISTOR | 18K | 1/16W | R212 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R129 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W | R213 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R130 | CEVPO05-223 | TRIM.RESISTOR | 22K | R.GAIN | R214 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R131 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | R215 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W |
| R132 | NRSA63J-154 | M.G.RESISTOR | 150K | 1/16W | R216 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W |
| R133 | NRSA63J-273 | M.G.RESISTOR | 27K | 1/16W | R217 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W |
| R134 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | R218 | NRSA63J-152 | M.G.RESISTOR | 1.5K | 1/16W |
| R135 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R219 | NRSA63J-182 | M.G.RESISTOR | 1.8K | 1/16W |
| R136 | QVPC406-103 | TRIM.RESISTOR | 10K | G-Mg | R220 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W |
| R137 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W | R221 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W |
| R138 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R222 | NRSA63J-182 | M.G.RESISTOR | 1.8K | 1/16W |
| R139 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R223 | NRSA63J-182 | M.G.RESISTOR | 1.8K | 1/16W |
| R140 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | R224 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W |
| R141 | CEVPO05-472 | TRIM.RESISTOR | 4.7K | R.CTL | R225 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W |
| R142 | CEVPO05-472 | TRIM.RESISTOR | 4.7K | B.CTL | R226 | NRSA63J-152 | M.G.RESISTOR | 1.5K | 1/16W |
| R143 | NRSA63J-822 | M.G.RESISTOR | 8.2K | 1/16W | R227 | NRSA63J-821 | M.G.RESISTOR | 820 | 1/16W |
| R144 | NRSA63J-100 | M.G.RESISTOR | 10 | 1/16W | R228 | NRSA63J-154 | M.G.RESISTOR | 150K | 1/16W |
| R145 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | R229 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W |
| R146 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W | R230 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W |
| R147 | NRSA63J-821 | M.G.RESISTOR | 820 | 1/16W | R232 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R148 | NRSA63J-471 | M.G.RESISTOR | 470 | 1/16W | R233 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W |
| R149 | NRSA63J-681 | M.G.RESISTOR | 680 | 1/16W | R234 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W |
| R150 | QVPC406-102 | TRIM.RESISTOR | 1K | SC | R235 | NRSA63J-563 | M.G.RESISTOR | 56K | 1/16W |
| R151 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | R236 | NRSA63J-683 | M.G.RESISTOR | 68K | 1/16W |
| R152 | NRSA63J-151 | M.G.RESISTOR | 150 | 1/16W | R237 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W |
| R153 | NRSA63J-221 | M.G.RESISTOR | 220 | 1/16W | R238 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R154 | NRSA63J-331 | M.G.RESISTOR | 330 | 1/16W | R239 | NRSA63J-563 | M.G.RESISTOR | 56K | 1/16W |
| R155 | NRSA63J-391 | M.G.RESISTOR | 390 | 1/16W | R240 | NRSA63J-393 | M.G.RESISTOR | 39K | 1/16W |
| R156 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | R241 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R157 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | R242 | NRSA63J-563 | M.G.RESISTOR | 56K | 1/16W |
| R158 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R243 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W |
| R159 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R244 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W |
| R160 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | R245 | NRSA63J-123 | M.G.RESISTOR | 12K | 1/16W |
| R161 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | R246 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W |
| R162 | NRSA63J-471 | M.G.RESISTOR | 470 | 1/16W | R247 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W |
| R163 | QVPC406-502 | TRIM.RESISTOR | 5K | V.P. | R248 | NRSA63J-123 | M.G.RESISTOR | 12K | 1/16W |
| R165 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | R249 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R166 | QVPC406-103 | TRIM.RESISTOR | 10K | H | R250 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W |
| R167 | NRSA63J-272 | M.G.RESISTOR | 2.7K | 1/16W | R251 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R168 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | R252 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W |
| R169 | QVPC406-103 | TRIM.RESISTOR | 10K | IRIS.LEVEL | R253 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W |
| R170 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | R254 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W |
| R171 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R301 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W |
| R172 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R302 | NRSA63J-152 | M.G.RESISTOR | 1.5K | 1/16W |
| R173 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | R303 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W |
| R174 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | R304 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R175 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | R306 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W |
| R176 | NRSA63J-333 | M.G.RESISTOR | 33K | 1/16W | R308 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W |
| R177 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | R309 | NRSA63J-122 | M.G.RESISTOR | 1.2K | 1/16W |
| R201 | NRSA63J-152 | M.G.RESISTOR | 1.5K | 1/16W | R310 | CEVPO05-222 | TRIM.RESISTOR | 2.2K | CCD.IRIS |
| R202 | CEVPO05-223 | TRIM.RESISTOR | 22K | AWB.B | R311 | NRSA63J-122 | M.G.RESISTOR | 1.2K | 1/16W |
| R203 | CEVPO05-223 | TRIM.RESISTOR | 22K | AWB.R | R312 | NRSA63J-392 | M.G.RESISTOR | 3.9K | 1/16W |
| R204 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | R313 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W |
| R205 | NRSA63J-472 | M.G.RESISTOR | 4.7K | 1/16W | R314 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W |

| Symbol No. | Part No. | Part Name | Description | | Symbol No. | Part No. | Part Name | Description | |
|------------|-------------|---------------|-------------|----------------|------------|-------------|---------------|---------------|------|
| R315 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C112 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R316 | NRSA63J-101 | M.G.RESISTOR | 100 | 1/16W | C113 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R317 | NRSA63J-562 | M.G.RESISTOR | 5.6K | 1/16W | C114 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R318 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W | C115 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R319 | NRSA63J-153 | M.G.RESISTOR | 15K | 1/16W | C116 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R320 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W | C117 | NCT06CH-470 | CER.CAPACITOR | 47P | 50V |
| R321 | NRSA63J-334 | M.G.RESISTOR | 330K | 1/16W | C118 | NCT06CH-680 | CER.CAPACITOR | 68P | 50V |
| R322 | NRSA63J-273 | M.G.RESISTOR | 27K | 1/16W | C119 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R323 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C120 | NCT06CH-560 | CER.CAPACITOR | 56P | 50V |
| R324 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | | | | | |
| R325 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | C121 | NCT06CH-100 | CER.CAPACITOR | 10P | 50V |
| R326 | NRSA63J-223 | M.G.RESISTOR | 22K | 1/16W | C122 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R328 | NRSA63J-274 | M.G.RESISTOR | 270K | 1/16W | C201 | NCT06CH-101 | CER.CAPACITOR | 100P | 50V |
| R329 | NRSA02J-105 | M.G.RESISTOR | 1.0M | 1/10W | C202 | NCT06CH-560 | CER.CAPACITOR | 56P | 50V |
| R330 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C203 | NCT06CH-560 | CER.CAPACITOR | 56P | 50V |
| R331 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C204 | NCT06CH-560 | CER.CAPACITOR | 56P | 50V |
| R332 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C205 | NCB31HK-103 | CER.CAPACITOR | 0.010 | 50V |
| R333 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C206 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R338 | NRSA63J-332 | M.G.RESISTOR | 3.3K | 1/16W | C207 | NCT06CH-390 | CER.CAPACITOR | 39P | 50V |
| R339 | NRSA63J-183 | M.G.RESISTOR | 18K | 1/16W | C208 | NEE21AM-475 | TAN.CAPACITOR | 4.7 | 10V |
| R340 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C209 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R342 | NRSA63J-0R0 | M.G.RESISTOR | 0 | 1/16W | C210 | NEE21AM-225 | TAN.CAPACITOR | 2.2 | 10V |
| R344 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C211 | NEE21AM-225 | TAN.CAPACITOR | 2.2 | 10V |
| R345 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W TK-1180E | C212 | NEE21AM-225 | TAN.CAPACITOR | 2.2 | 10V |
| R346 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W TK-1280E | C213 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R348 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C214 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R350 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C215 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R352 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C216 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R353 | NRSA63J-104 | M.G.RESISTOR | 100K | 1/16W | C217 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R354 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C218 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R355 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C219 | NCB21HK-473 | CER.CAPACITOR | 0.047 | 50V |
| R356 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C220 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R357 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C221 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R358 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C222 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R359 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C301 | NEA10JM-226 | E.CAPACITOR | 22 | 6.3V |
| R360 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C302 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R361 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C303 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R362 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C304 | NEE21VM-104 | TAN.CAPACITOR | 0.10 | 35V |
| R363 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C305 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R364 | NRSA63J-103 | M.G.RESISTOR | 10K | 1/16W | C306 | NEE21CM-105 | TAN.CAPACITOR | 1.0 | 16V |
| R365 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C307 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R366 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C308 | NCB21EK-104 | CER.CAPACITOR | 0.10 | 25V |
| R367 | NRSA63J-102 | M.G.RESISTOR | 1.0K | 1/16W | C309 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R369 | NRSA63J-183 | M.G.RESISTOR | 18K | 1/16W | C311 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R370 | NRSA63J-473 | M.G.RESISTOR | 47K | 1/16W | C312 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| R371 | NRSA63J-183 | M.G.RESISTOR | 18K | 1/16W | C313 | NEA10JM-226 | E.CAPACITOR | 22 | 6.3V |
| R372 | NRSA63J-471 | M.G.RESISTOR | 470 | 1/16W | C314 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V |
| C101 | NEA10JM-226 | E.CAPACITOR | 22 | 6.3V | C315 | NEE21VM-474 | TAN.CAPACITOR | 0.47 | 35V |
| C102 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V | C316 | NCT06CH-150 | CER.CAPACITOR | 15P | 50V |
| C103 | NEA10JM-226 | E.CAPACITOR | 22 | 6.3V | C317 | NCT06CH-150 | CER.CAPACITOR | 15P | 50V |
| C104 | NEA11CM-106 | E.CAPACITOR | 10 | 16V | | | | | |
| C105 | NEA11CM-106 | E.CAPACITOR | 10 | 16V | L301 | CELP008-101 | COIL | 100UH | |
| C106 | NEA11CM-106 | E.CAPACITOR | 10 | 16V | | | | | |
| C107 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V | X301 | CE41216-001 | CRYSTAL | 4MHz | |
| C108 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V | | | | | |
| C109 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V | S101 | NSS1A23-C01 | SELECT SWITCH | WHITE BALANCE | |
| C110 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V | S102 | CESD004-004 | DIP SWITCH | SHUTTER MODE | |
| C111 | NCF31CZ-104 | CER.CAPACITOR | 0.10 | 16V | | | | | |

● TERMINAL board assembly list 06

SCK2336-02-40A (TK-1280E)

SCK2336-02-61A (TK-1180E)

06□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|------------|-------------|
| CN7 | CHB102W-24R | CONNECTOR | 24PIN |
| CN8 | CHB102W-24R | CONNECTOR | 24PIN |
| TP101 | SSV1096-001 | TEST POINT | |
| TP102 | SSV1096-001 | TEST POINT | |
| TP201 | SSV1096-001 | TEST POINT | |
| TP301 | SSV1096-001 | TEST POINT | |
| TP302 | SSV1096-001 | TEST POINT | |

| Symbol No. | Part No. | Part Name | Description |
|------------|--------------|---------------|---------------------|
| Q1 | 2SC2778(C) | TRANSISTOR | MATSUSHITA |
| D1 | S1ZB10 | BRIDGE DIODE | SINDENGEN |
| D3 | MA157 | DIODE | MATSUSHITA TK-1280E |
| D4 | MA157 | DIODE | MATSUSHITA TK-1280E |
| D5 | MA157 | DIODE | MATSUSHITA |
| D6 | MA157 | DIODE | MATSUSHITA |
| D7 | MA157 | DIODE | MATSUSHITA |
| D8 | MA157 | DIODE | MATSUSHITA |
| D9 | MA157 | DIODE | MATSUSHITA |
| D10 | MA157 | DIODE | MATSUSHITA |
| D11 | MA157 | DIODE | MATSUSHITA |
| LD1 | SEL2310G | LED(GREEN) | |
| R1 | NRSA02J-102 | M.G.RESISTOR | 1.0K 1/10W |
| R2 | NRSA02J-680 | M.G.RESISTOR | 68 1/10W TK-1280E |
| R3 | NRSA02J-680 | M.G.RESISTOR | 68 1/10W TK-1280E |
| R4 | NRSA02J-680 | M.G.RESISTOR | 68 1/10W |
| R5 | NRSA02J-272 | M.G.RESISTOR | 2.7K 1/10W |
| R6 | NRSA02J-223 | M.G.RESISTOR | 22K 1/10W |
| R7 | NRSA02J-563 | M.G.RESISTOR | 56K 1/10W |
| R8 | NRSA02J-820 | M.G.RESISTOR | 82 1/10W |
| R9 | NRSA02J-104 | M.G.RESISTOR | 100K 1/10W |
| R10 | QRZ0098-1R0 | W.RESISTOR | 1 |
| R11 | NRSA02J-564 | M.G.RESISTOR | 560K 1/10W |
| R12 | NRSA02J-564 | M.G.RESISTOR | 560K 1/10W |
| C1 | QER40JM-107 | E.CAPACITOR | 100 6.3V |
| C2 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C3 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C4 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C5 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C6 | NCB21HK-103 | CER.CAPACITOR | 0.010 50V |
| C7 | NCB21HK-103 | CER.CAPACITOR | 0.010 50V |
| C8 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C9 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C10 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C11 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| CN9 | CHB102W-22R | CONNECTOR | 22PIN |
| TP1 | SSV1096-001 | TEST POINT | |
| TP2 | SSV1096-001 | TEST POINT | |
| TP3 | SSV1096-001 | TEST POINT | |
| FC1 | YU40832 | FUSE CLIP | |
| FC2 | YU40832 | FUSE CLIP | |
| △ F1 | QMF51E2-1R0S | FUSE | 1A 250V |

● MOTHER board assembly list 07
 SCK2336-01-P0A
 (TK-1280E/1281EG/1180E)

07□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|--------------|---------------|-------------|
| IC1 | UPC358G | I.C.(M) | NEC |
| IC2 | AN8002M | I.C.(M) | MATSUSHITA |
| Q1 | 2SB956(ST) | TRANSISTOR | MATSUSHITA |
| Q2 | 2SB956(ST) | TRANSISTOR | MATSUSHITA |
| R1 | NRSA02J-332 | M.G.RESISTOR | 3.3K 1/10W |
| R2 | NRSA02J-102 | M.G.RESISTOR | 1.0K 1/10W |
| R3 | NRSA02J-563 | M.G.RESISTOR | 56K 1/10W |
| R4 | NRSA02J-223 | M.G.RESISTOR | 22K 1/10W |
| R5 | NRVA02D-4701 | M.F.RESISTOR | 47 1/10W |
| R6 | NRVA02D-5601 | M.F.RESISTOR | 56 1/10W |
| R7 | NRSA02J-332 | M.G.RESISTOR | 3.3K 1/10W |
| R8 | NRSA02J-102 | M.G.RESISTOR | 1.0K 1/10W |
| R9 | NRSA02J-563 | M.G.RESISTOR | 56K 1/10W |
| R10 | NRSA02J-222 | M.G.RESISTOR | 2.2K 1/10W |
| R11 | CEVP005-471 | TRIM.RESISTOR | 470 5V.ADJ |
| R12 | NRSA02J-182 | M.G.RESISTOR | 1.8K 1/10W |
| R14 | NRSA02J-0R0 | M.G.RESISTOR | 0 1/10W |
| R15 | NRSA02J-0R0 | M.G.RESISTOR | 0 1/10W |
| R16 | NRSA02J-102 | M.G.RESISTOR | 1.0K 1/10W |
| C2 | QEHA1EM-227 | E.CAPACITOR | 220 25V |
| C3 | QEHA1EM-227 | E.CAPACITOR | 220 25V |
| C4 | QEHA1EM-227 | E.CAPACITOR | 220 25V |
| C5 | QEHA1EM-227 | E.CAPACITOR | 220 25V |
| C6 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C7 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C8 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C10 | NEE11CM-226 | TAN.CAPACITOR | 22 16V |
| C11 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C12 | NEE21CM-105 | TAN.CAPACITOR | 1.0 16V |
| C14 | NEE11CM-226 | TAN.CAPACITOR | 22 16V |
| C15 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| CN1 | CHB102W-24P | CONNECTOR | 24PIN |
| CN2 | CHB102W-24P | CONNECTOR | 24PIN |
| CN3 | CHB102W-18P | CONNECTOR | 18PIN |
| CN4 | CHB102W-18P | CONNECTOR | 18PIN |
| CN5 | CHB102W-24P | CONNECTOR | 24PIN |
| CN6 | CHB102W-24P | CONNECTOR | 24PIN |
| CN7 | CHB102W-24P | CONNECTOR | 24PIN |
| CN8 | CHB102W-24P | CONNECTOR | 24PIN |
| CN9 | CHB102W-22P | CONNECTOR | 22PIN |
| CP1 | ICP-F10 | I.C.PROTECTOR | |

● CONNECTOR board assembly list 08
 SCK2341-03-40A (TK-1281EG)

08□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|-----------|-------------|
| CN9 | CHB102W-22R | CONNECTOR | 22PIN |
| CN13 | SCV1770-015 | CONNECTOR | 15PIN |
| CN15 | SCV1770-005 | CONNECTOR | 5PIN |

● TERMINAL board assembly list 09

SCK2341-02-40A (TK-1281EG)

09□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|--------------|-------------|
| Q1 | 2SC2778(BC) | TRANSISTOR | MATSUSHITA |
| D3 | MA157 | DIODE | MATSUSHITA |
| D4 | MA157 | DIODE | MATSUSHITA |
| D5 | MA157 | DIODE | MATSUSHITA |
| D6 | MA157 | DIODE | MATSUSHITA |
| D7 | MA157 | DIODE | MATSUSHITA |
| D8 | MA157 | DIODE | MATSUSHITA |
| D9 | MA157 | DIODE | MATSUSHITA |
| D10 | MA157 | DIODE | MATSUSHITA |
| D11 | MA157 | DIODE | MATSUSHITA |
| LD1 | SEL2310G | LED(GREEN) | |
| R1 | NRSA02J-102 | M.G.RESISTOR | 1.0K 1/10W |
| R2 | NRSA02J-680 | M.G.RESISTOR | 68 1/10W |
| R3 | NRSA02J-680 | M.G.RESISTOR | 68 1/10W |
| R4 | NRSA02J-680 | M.G.RESISTOR | 68 1/10W |
| R5 | NRSA02J-272 | M.G.RESISTOR | 2.7K 1/10W |
| R6 | NRSA02J-223 | M.G.RESISTOR | 22K 1/10W |
| R7 | NRSA02J-563 | M.G.RESISTOR | 56K 1/10W |
| R8 | NRSA02J-820 | M.G.RESISTOR | 82 1/10W |
| C1 | NEA10JM-107 | E.CAPACITOR | 100 6.3V |
| CN13 | SCV1770-015 | CONNECTOR | 15PIN |
| TP1 | SSV1096-001 | TEST POINT | |
| TP2 | SSV1096-001 | TEST POINT | |
| TP3 | SSV1096-001 | TEST POINT | |

● POWER board assembly list 10

SCK2341-01-40A (TK-1281EG)

10□□□□□□

| Symbol No. | Part No. | Part Name | Description |
|------------|-------------|---------------|-------------|
| D1 | S1ZB10 | BRIDGE DIODE | SINDENGEN |
| R9 | NRSA02J-104 | M.G.RESISTOR | 100K 1/10W |
| R10 | QRZ0098-1R0 | W.RESISTOR | 1 2W |
| R11 | NRSA02J-564 | M.G.RESISTOR | 560K 1/10W |
| R12 | NRSA02J-564 | M.G.RESISTOR | 560K 1/10W |
| C2 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C3 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C4 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C5 | NCB21EK-104 | CER.CAPACITOR | 0.10 25V |
| C10 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C11 | NCB21HK-473 | CER.CAPACITOR | 0.047 50V |
| C14 | NCB21HK-103 | CER.CAPACITOR | 0.010 50V |
| C15 | NCF21HZ-104 | CER.CAPACITOR | 0.10 50V |
| △ CN14 | SCV1752-002 | CONNECTOR | 2PIN |
| CN15 | SCV1770-005 | CONNECTOR | 5PIN |
| FC1 | YU40832 | FUSE CLIP | for F1 |
| FC2 | YU40832 | FUSE CLIP | for F1 |
| △ F1 | QMF51A2-R08 | FUSE | T80mA 250V |